SEPTEMBER 1, 1960
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TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

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THE INDUSTRY'S COMPETITIVE CHALLENGE

A Handy Manual of Facts, by Allan R. Stacey

SUBSCRIBER-OWNED EQUIPMENT, by D. A. Perigo

New C. O. Test Unit Reduces Ladder Time, by C. D. Ehinger

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THE TE&M FRONT COVER

Participants in U.S.I.T.A.'s 1960 Management Development Program, conducted by the School of Business, University of Kansas, Lawrence, represented 35 telephone companies. Front cover photo shows students in classroom. For complete story see page 62.

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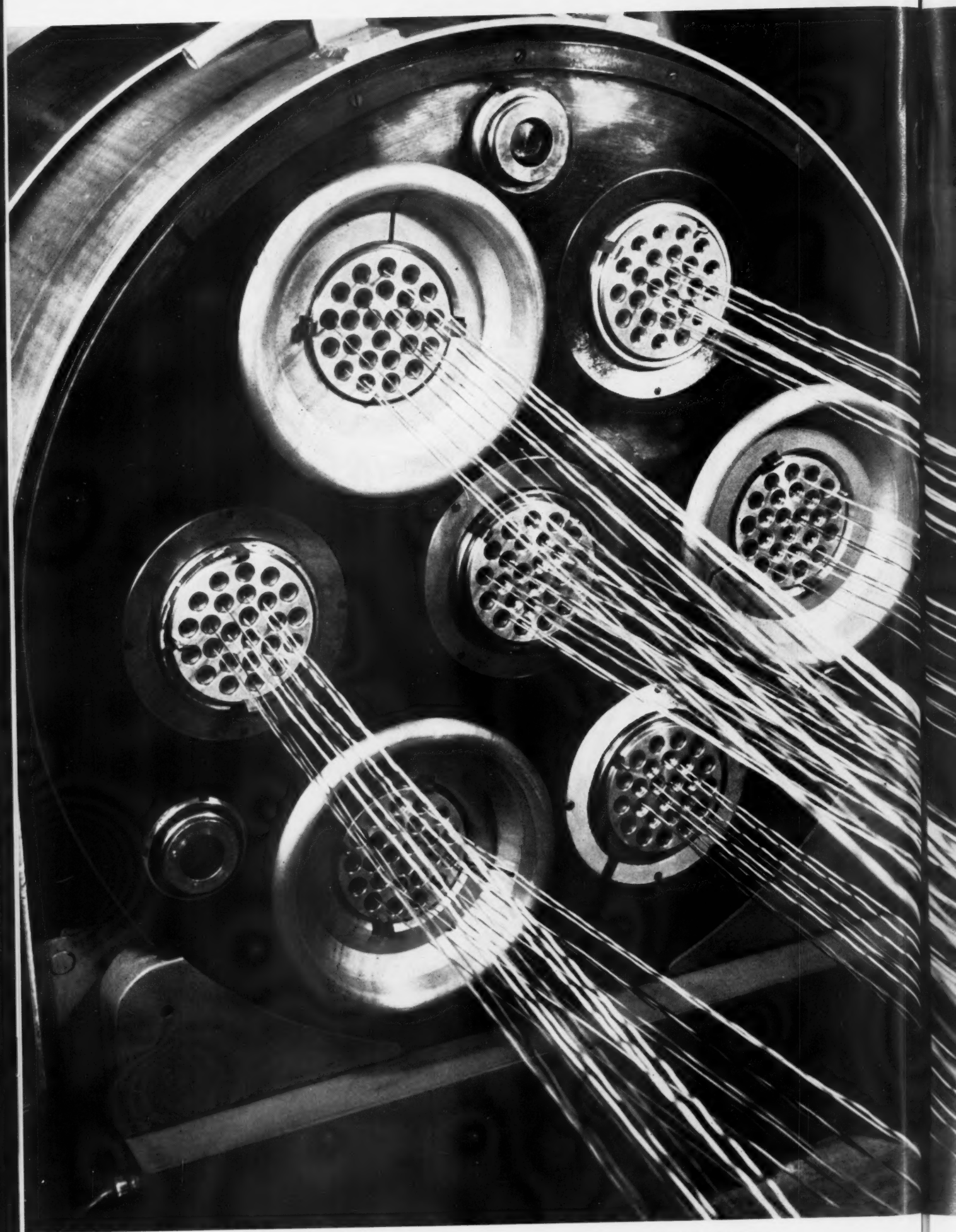

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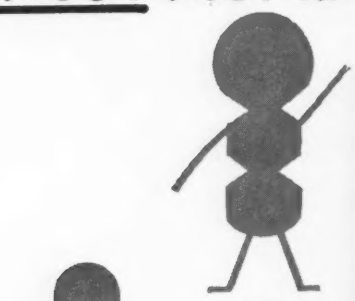

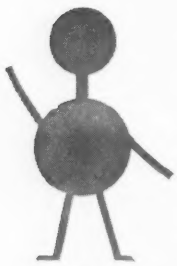

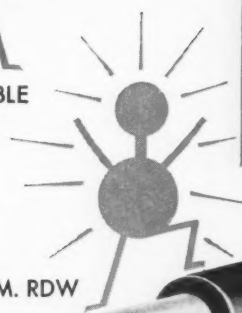

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—WASHINGTON OBSERVATIONS—

By ROLAND DAVIES and FRED HENCK

Industrial Defense Program

An industrial defense program designed specifically for the nation's common carrier communications industry has been announced by the Department of Defense, which prepared the standards for the program in collaboration with representatives of the industry.

Defense officials said the purpose of industrial defense in the communications industry is to prevent or protect against sabotage, espionage or other subversive activity; to reduce vulnerability; and to prevent or minimize the effects of damage resulting from enemy attack.

The program includes a review of industrial defense plans and policies at the company level, and a determination of the security status of selected facilities, based on on-site surveys made by military personnel. Companies participating in the completely voluntary program will assume any related costs.

The Defense Department has prepared two forms for the domestic and international carriers covering "Communications Company" and "Communications Facility." Criteria developed for the program and whose application by industry is desirable "are intended as material for the guidance of both government representatives and company management in appraising the status of key communications facilities.

"The acceptance of such criteria by the industry does not imply a commitment to implement the features included in such criteria, or the recommendations submitted by government representatives," it was declared.

The criteria were developed jointly by representatives of the Defense Department and the industry during a series of meetings and field tests. Area meetings were held with officials of the Western Union Telegraph Co. in various cities around the country, and with officials of the American Telephone & Telegraph Co. and associated Bell System companies and Independent telephone companies in their respective areas. The communications industry was the first one selected for such a program by the Defense Department.

The criteria recommend that each company in the communications industry should appoint an industrial defense coordinator to be responsible for industrial defense matters at the company level, and a facility coordinator for responsibility at the national level.

The Army will conduct the program through its field offices and will make personal contact with the companies located in the various Army areas. Routine checks and reports will be conducted annually.

Initial surveys are expected to be started by the Army during September in connection with the program, which is under the direction of the Assistant Secretary of Defense (Supply & Logistics) Industrial Facilities Protection Branch.

Rule Changes Adopted By FCC

Rule changes eliminating the requirements for oath or affirmation for several types of applications filed by common carriers with the FCC have been adopted by the Commission and put into effect. The FCC pointed out that the Communications Act does not require that applications under Title II of the law (relating to common carriers) be under oath or affirmation, and said that the rule provisions relating to verification impose a burden on the applicants and sometimes delay action when it is inadvertently omitted.

Elimination of the oath or affirmation requirement, as directed by the

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WASHINGTON OBSERVATIONS

(Continued from page 9)

FCC Rule Changes (Continued)

FCC, affects Parts 61 (tariffs), 62 (interlocking directorates), and 63 (extension of lines and discontinuance of service) of the Commission's rules.

The Commission has proposed to Congress that the requirement be eliminated from some other documents, including annual reports of carriers, but to date the recommendations have not been enacted into law.

Beirne Discusses Automation

Supplementing the views he expressed recently on automation in the communications industry, in an appearance before the Joint (Congressional) Economic Committee, Communications Workers of America President Joseph A. Beirne has declared that labor and management in the industry "must learn to live" with the problems brought about by automation, and "make certain that machines serve men, and that men never become slaves of machines."

Mr. Beirne made his latest remarks as spokesman for the AFL-CIO, of which he is a vice president.

He declared that "It would be easy, but irresponsible, to fight against the introduction of automation's labor-saving devices in the communications industry . . . it would be easy, because people enjoy whipping the devil with oratory. But for organized labor to indulge in this easy 'luxury' would serve no useful purpose. It would not help our members, our union, or the nation in which we live."

"Project Echo" Succeeds. Balloon Reflects Coast-to-Coast Signals

A giant step in the program to establish a satellite communications system was taken August 12, when a 100-foot balloon was sent into orbit 1000 miles above the earth and then used as a passive reflector for bouncing radio signals between stations on the ground. The successful Project Echo experiment — conducted by the National Aeronautics & Space Administration, Bell Telephone Laboratories, and the Jet Propulsion Laboratory at Goldstone, Calif. — was marked by the transmission of a taped message by President Eisenhower which originated at the JPL station in Goldstone, was bounced off the balloon, and then received at the Bell Laboratories' installation in Holmdel, N. J.

In addition to taking part in the voice communications test, Bell Laboratories also contributed to the launching of the satellite. The balloon was directed into its selected circular orbit by the Laboratories command guidance system, which was developed for the Air Force Ballistic Missile Division for use in the Titan intercontinental ballistic missile.

The Project Echo experiments are aimed at determining the technical feasibility of commercial overseas communications by way of reflecting, or "passive," satellites. In last Friday's experiment, the reception was reported to be of very high quality. "Although the antennas lost track of the balloon for a short time, the message was successfully received several times during the 15 minutes the balloon was in line of sight of both stations," it was reported. During the day, the U. S. Air Force reported it had completed the first overseas transmission of a message by use of the satellite. The Air Research & Development Command said that a signal sent from Trinidad, West Indies, bounced off the satellite and was received at Floyd, N. Y., some 2400 miles away.

The success of the experiment brightened prospects and brought closer the time when transoceanic telephone calls and live television programs might be transmitted via satellites.

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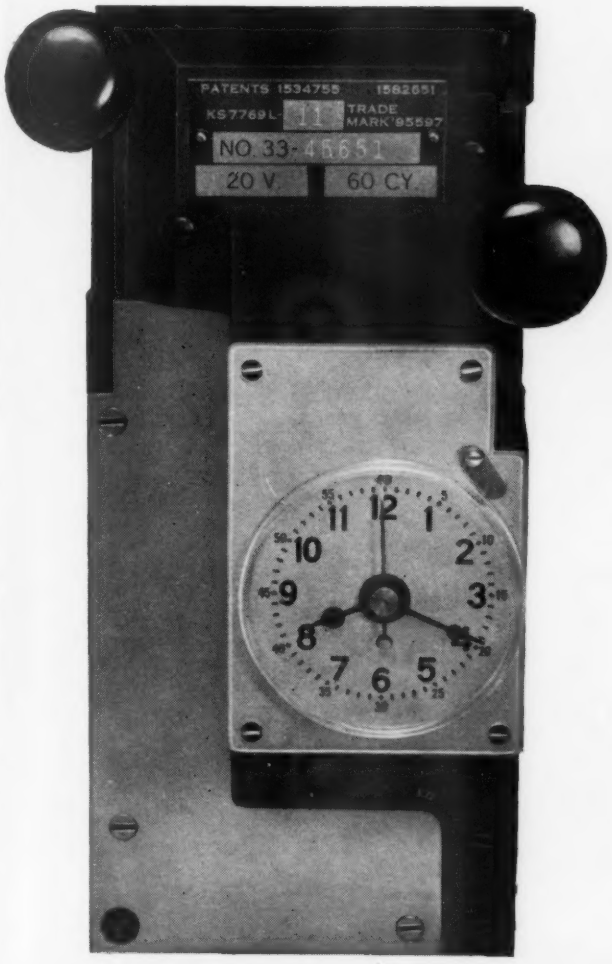

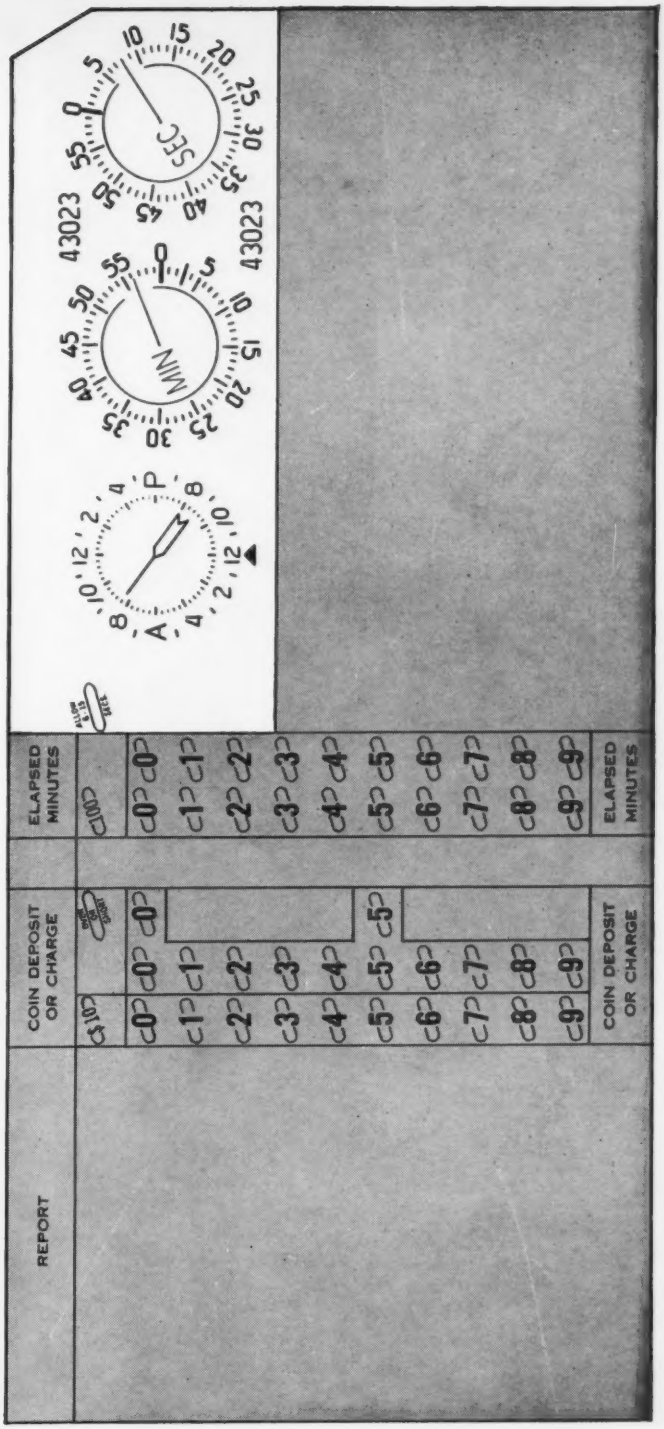

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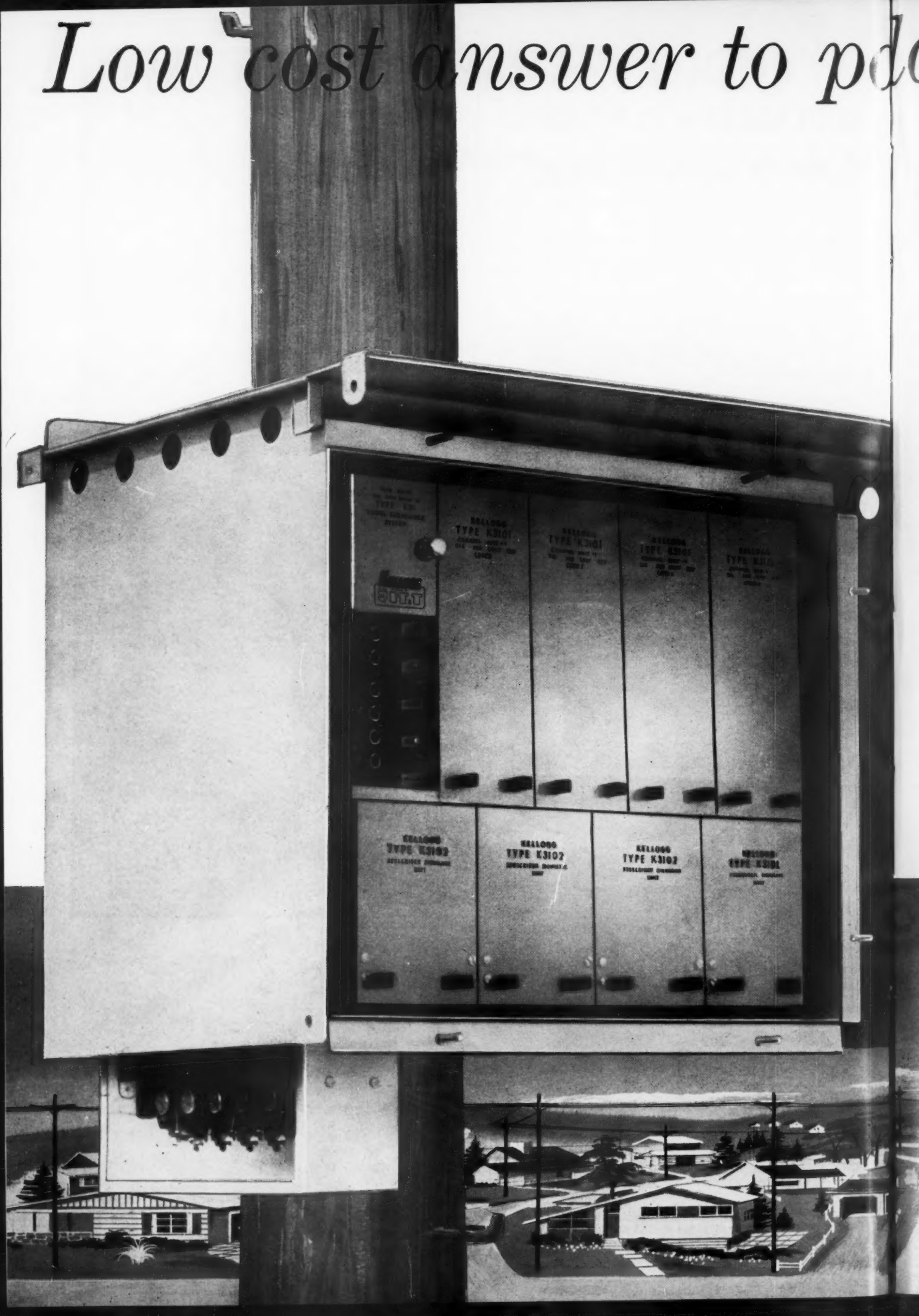

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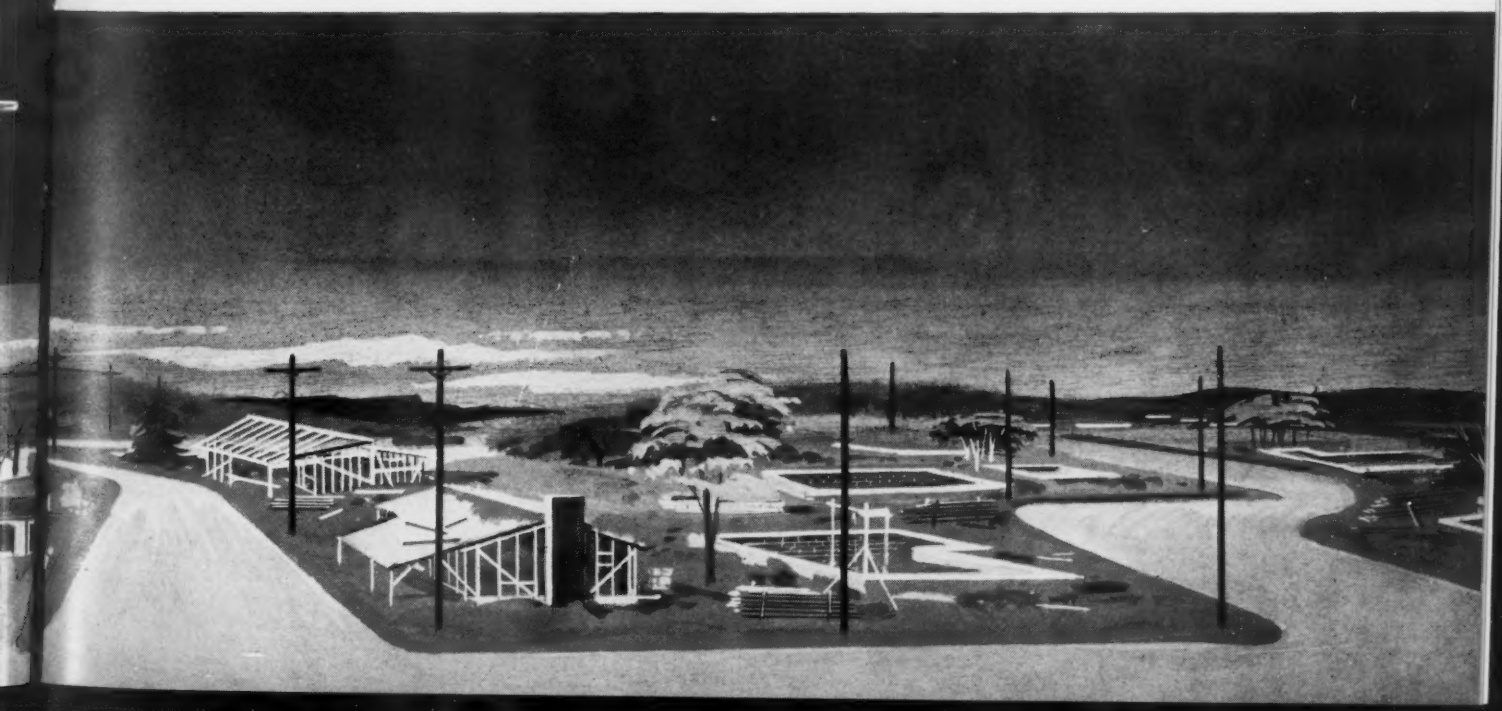

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GENERAL SYSTEM

INDUSTRY OBSERVATIONS

By L. A. GRITTEN

What Getty Got

WHAT DOES it cost your company to hold a management conference at some central point? After he has studied several dozen hotel bills and expense vouchers, your Big Man may answer "Too much!"

J. Paul Getty solved the problem in his organization by purchasing the Duke of Sutherland's estate, some 23 miles from London. It includes an old manor house stuffed with beautiful furniture, eight major living rooms, 14 principal bedrooms, 20 lesser rooms, 16 bathrooms, a 140-foot ballroom, golf course, tennis court and 187 acres of park land.

In these lovely surroundings Getty's executives and associates gather to talk shop. And the amazing part is that the deal was made, on the advice of his accountants, as an economy measure.

The telephone business is hardly in the same category as the billionaire oil king's empire, but the idea may apply to our larger companies. If our unions and the Congress maintain their pace, there should soon be plenty of suitable estates available in this country, going for the taxes.

Bolivian Tele-renaissance

THE BOLIVIAN government plans to reorganize and expand the communications system of the country. A separate Ministry of Communications will be formed.

Bolivia is up in the air, physically and otherwise. It boasts a lofty capital (La Paz, 340,000 population, altitude 11,800 feet) and the highest great lake in the world, Titicaca, 12,500 feet.

There were 19,909 telephones in Bolivia on January 1, 1959, a decline from 23,200 in 1958. They are privately operated. They serve a population of about 3,311,000 of whom 50 per cent are Indians speaking native dialects and 13 per cent are whites. Bolivia is entirely surrounded by rival countries; it lost its Pacific Ocean seacoast in the war of 1879.

Last year an injudicious article in an American magazine provoked anti-U.S. riots in La Paz. The U. S. Embassy was stoned. An American flag was burned. The latter offense was repeated a few days ago, at Communist instigation. So, if you tell them that their efforts to modernize their telephone system will have the hearty good wishes of Americans, they may not Bolivia.

Dinosaur Directories

SOME 15,000 copies of the new Moscow, U.S.S.R., telephone directory, the first to be published in 6 years, were sold out in a few hours when offered to the public at 13 rubles ($1.30) a copy. Are you looking down your nose at these backward people and their archaic ideas about directories? We must admit a doubt. Possibly the Russian approach may make sense.

Here we toss our directories away gratis, thrown in with the service, with the Yellow Pages usually carrying the load. Sometimes there is a humorous but meaningless printed proviso that nobody reads, to the effect that the book is the property of the telephone company.

At home and in most offices, the customer thinks of it as his own, part of the service he pays for; so he gives the book reasonably decent treatment.

In public places, booths, hotels, stores, etc., people treat it like anything else they get for nothing. Pages are torn out for any purpose under the sun, from salesmen's calling lists to emergency toilet paper. If a directory lasts two weeks in an average city booth, it becomes a torn and worthless mess; but frequently it doesn't; someone steals it — as well as the chain and the cover, often enough — within a few days.

If we were to impose a charge for every directory,

"CHARLIE," by Jim Counts

CHARLIE... YOU'VE BEEN WITH US FOR A GOOD WHILE NOW...
I'M GONNA TEACH YOU HOW TO CLIMB!
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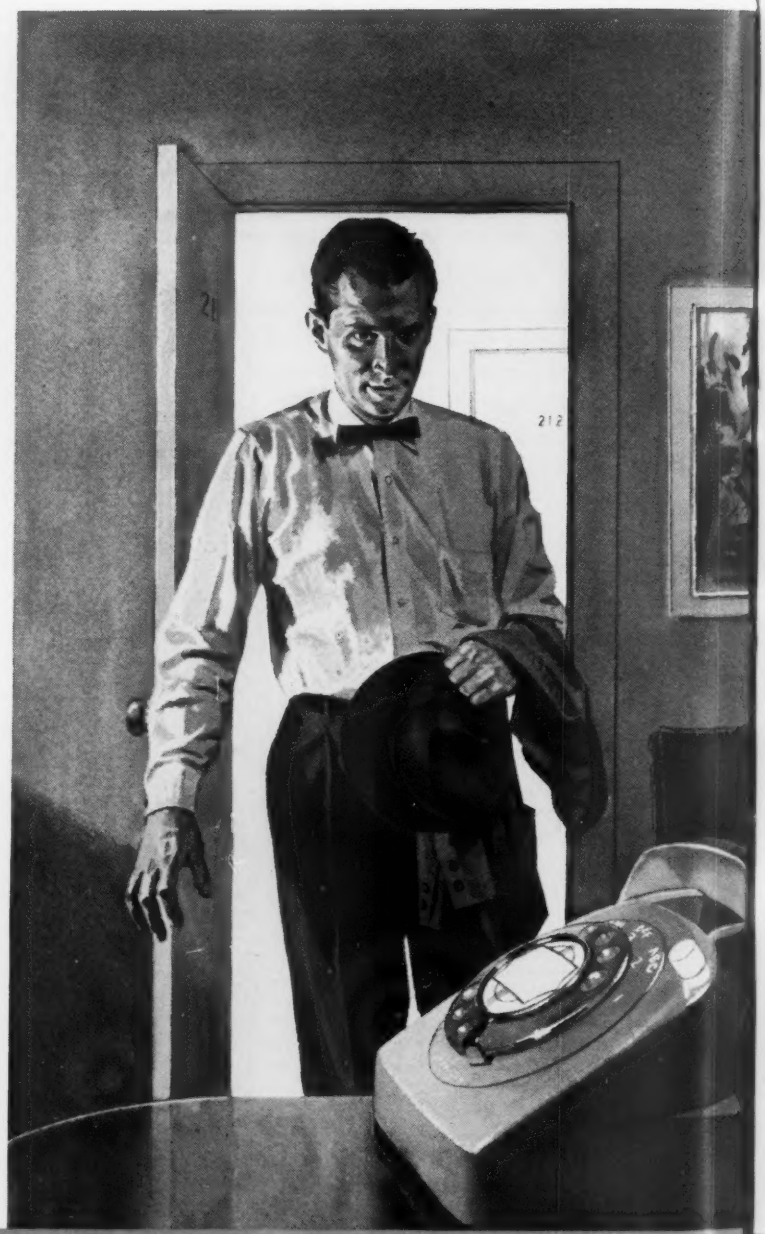

Flashing light is activated on the P-A-B-X or P-B-X extension. When the guest returns, the light signals him to call the attendant for a message. The service does not interfere with normal telephone operation.

Builder!

eland Motels

Here's a new convenience for your hotel and motel subscribers to offer their guests. It's called Message-Waiting Service—another auxiliary feature for P-A-B-X and P-B-X systems.

With Message-Waiting Service, a hotel or motel guest receives phone messages the instant he returns to his room. Here's how the service works: all calls are answered by the P-A-B-X or P-B-X attendant, who rings the guest's phone. If there is no answer, the attendant takes the message and operates a key on the cabinet. This activates a light on the guest's phone. When the guest returns, the light is a signal to call the attendant for a message.

Message-Waiting Service includes an attendant cabinet, plus special Type 80 phones with built-in lamps. The cabinet is equipped with 60 keys (expandable to 100), or 140 keys (expandable to 200). Control equipment is separate and wires easily into switching equipment.

Your hotel and motel subscribers will welcome this new convenience. More conveniences mean more repeat business. And keep in mind that Message-Waiting Service is an auxiliary feature which helps you *sell* P-A-B-X and P-B-X systems.

AUTOMATIC ELECTRIC

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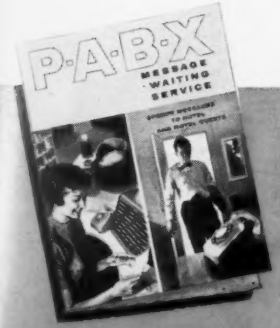
GENERAL SYSTEM



FREE

Sales Aid!

This four-page folder helps you promote Message-Waiting Service. Directed to the hotel or motel man. Tells him exactly how the system works and how he benefits from it. Helps you make the sale! Let us know how many copies you'll need. Write Automatic Electric Sales Corporation, Northlake, Illinois.

"OBSERVATIONS"

(Concluded from page 18)

even a 50¢ deterrent, far below the actual cost, we would make money and save books. People respect what they have to pay for.

The Yellow Pages? Run them in separate books everywhere, not merely in the larger centers. With Direct Distance Dialing tying our far-flung communities ever more closely together, there is no longer much reason for local Yellow Sections in little cities.

Extra load on Information? Of course! That is inevitable, made mandatory by the D.D.D. objective.

The big city telephone directory alphabet section, like the mesozoic dinosaur, has outgrown its capacity to serve and survive. It is vast, awkward and obsolescent. It must be replaced, the sooner the better, by a nationwide electronically-aided service that will, in a few seconds, tell any caller the number of any telephone he wishes to dial, whether it be across the street or two thousand miles away. That is the logical and inescapable corollary to universal Direct Distance Dialing.

Why not? We have enough scientific and engineering brains in our business to bounce messages from spatial satellites and to make possible the amazing controlled intercontinental missiles used by the Armed Forces. We cannot imagine that it is beyond the scope of these geniuses to devise an Information service in keeping with the communications marvels they have already achieved.

Besides — have you ever tried to look up your old friend Smith or Jones or Brown or Hansen or Johnson or Nelson, in a big city directory printed in 6-point type? It is little wonder that a General Telephone & Electronics staff study "to reduce the Information Calling Rate" has revealed that more than 50 per cent of the calls handled by Information are requests for numbers listed in the customer's home directory.

Straws In The Wind

A NEWLY formed French Center for Studies of Automatic Translation has been commissioned to plan methods of mechanical translation of scientific and technical literature, particularly from Russian into French.

Translation from other languages, including Chinese, will be considered later; but it is significant that Russian is the first and most important objective.

In New York, next December, the American Association for the Advancement of Science will sponsor a "Symposium on the Sciences of Communist China."

It seems only yesterday that we were sending our experts to these backward countries to teach them the rudiments of scientific production! They appear to have learned.

Gold For Gamblers

FIRST a definition, for the benefit of the younger generation: Gold is a heavy yellow metal used in relay contacts and in U. S. coins during the pre-New Deal era, when a $5 gold piece would buy a steak dinner for two.

The Union of South Africa produces annually 17,000,000 ounces of gold, well over half of the Free World output. The South Africans, angry about the Negro controversy, now contemplate secession from the British Commonwealth of Nations. They propose to raise the price of gold to $105 an ounce, nearly three times its present fixed price.

Canada claims the largest untapped gold resources outside of the U.S.S.R. — and Canadian mining concerns are getting busy. Sounds exciting — but please don't blame us for what may happen to you. For some decades, our own experience of the stuff has been confined to its use by dentists; and as we never had our fillings assayed, we are not even sure about that.

"Whazzat Button Mean?"

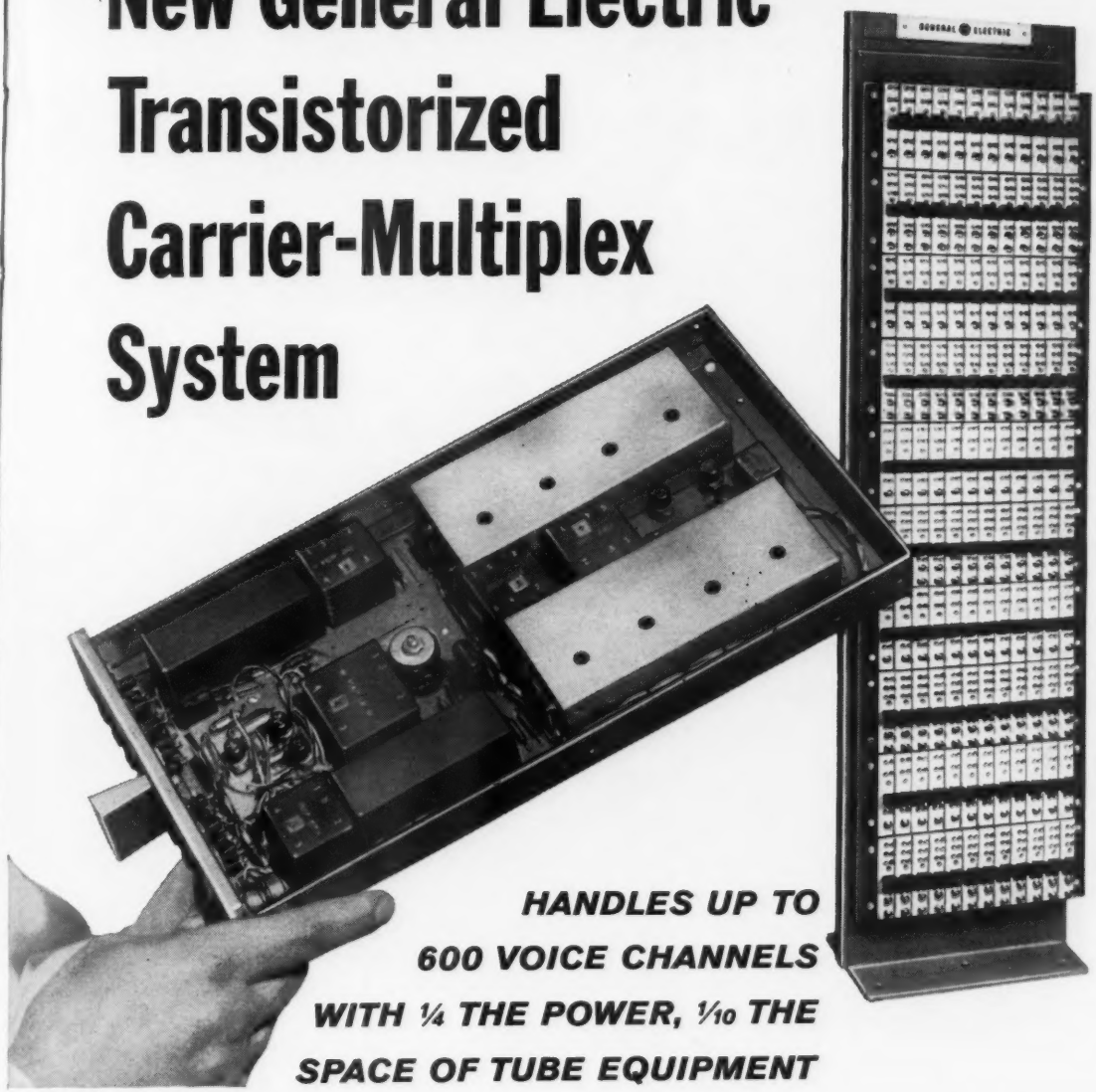
IN THE Carolina Telephone & Telegraph Company, fashionable attire for the best people includes a big white button, bearing a 4-cent postage stamp. Puzzled enquirers are informed: "Four cents a day is the cost of an extension telephone."

This clever sales idea could be applied in other ways. A big "4%," for example, would bring this information to the curious: "That is what the government pays for money to lend to cooperatives at 2 per cent, for their reinvestment, if convenient, at 5 per cent."

Or a "TEN" would bring this answer: "Ten per cent is what the Government hangs on your telephone bills, to pay farmers for not raising wheat, and similar foolishness."

The possibilities of the device are fascinating. — *L. A. Gritten.*

New General Electric Transistorized Carrier-Multiplex System



HANDLES UP TO 600 VOICE CHANNELS WITH ¼ THE POWER, ⅒ THE SPACE OF TUBE EQUIPMENT

General Electric's new TCS-600 is the world's first fully transistorized carrier-multiplex system capable of handling from one to 600 voice channels on either metallic circuits or a single radio circuit. A single sideband suppressed carrier system, the TCS-600 meets or exceeds all domestic and CCITT standards.

Power Requirements: The TCS-600 consumes less than 900 watts of DC power for 600 voice channels with terminations — only 8 to 25 per cent of the power needed by tube equipment. Users will realize dramatic savings in purchased power, station batteries and chargers.

Mounting Space: Thanks to transistorization, the TCS-600 takes only one-third to one-tenth the space occupied by conventional tube equipment. Now 600 voice channels will fit into the same area taken by 120 channels of tube equipment. You can expand at any time to full capacity without costly rewiring or building alterations.

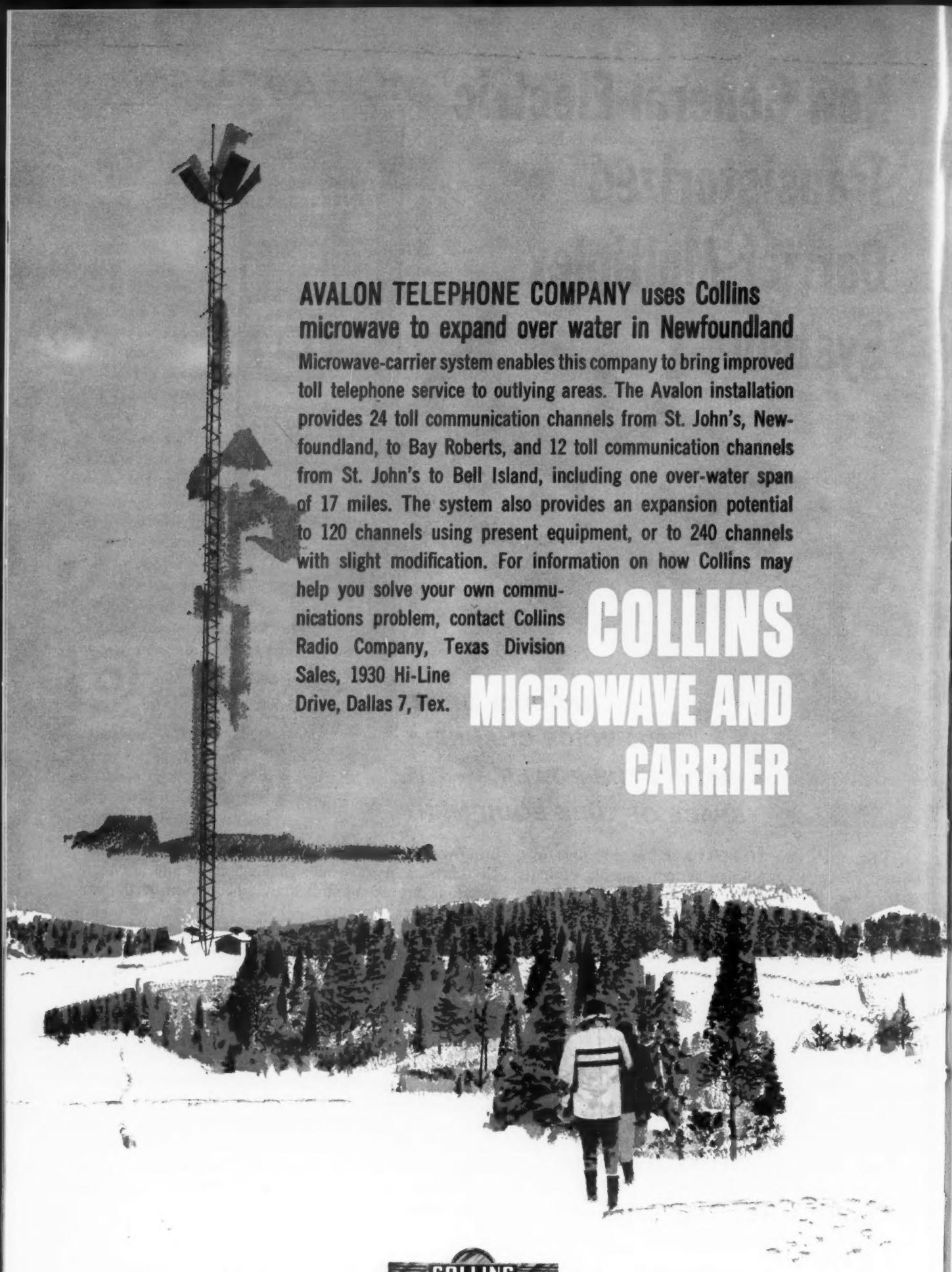
No Relays: The TCS-600 is the first carrier system to bring you the full benefits of completely static operation. No relays are used — all signalling, alarm indication and switching are accomplished by silicon controlled rectifiers or power transistors.

Reliability: The TCS-600 has a parallel circuit for each active circuit in the common equipment. Thus if any circuit should fail, all but a single voice channel will continue to operate via the parallel circuit.

Long Life: Carefully selected transistor types, operating well below recommended temperature and current ratings, assure exceptionally long life for the TCS-600. Lower operating temperatures also greatly extend the life of other components.

You'll be surprised by the low first cost and high yearly savings made possible by the TCS-600. For full details, write General Electric Company, Communication Products Dept., Section 45960-1, Mountain View Road, Lynchburg, Va.

GENERAL ELECTRIC



AVALON TELEPHONE COMPANY uses Collins microwave to expand over water in Newfoundland

Microwave-carrier system enables this company to bring improved toll telephone service to outlying areas. The Avalon installation provides 24 toll communication channels from St. John's, Newfoundland, to Bay Roberts, and 12 toll communication channels from St. John's to Bell Island, including one over-water span of 17 miles. The system also provides an expansion potential to 120 channels using present equipment, or to 240 channels with slight modification. For information on how Collins may help you solve your own communications problem, contact Collins Radio Company, Texas Division Sales, 1930 Hi-Line Drive, Dallas 7, Tex.

COLLINS MICROWAVE AND CARRIER

COLLINS

COLLINS RADIO COMPANY • DALLAS, TEXAS • CEDAR RAPIDS, IOWA • BURBANK, CALIFORNIA

EDITORIAL

"A New Era In World Communications"

IN THE BOOKS carrying the record of the scientific accomplishments of the U. S. A. another date and another story must be added.

The date, of course, is August 12, 1960. And the story is built around the fact that on that date a major step in the program to establish a satellite communications system was taken, when a 100-foot balloon was sent into orbit 1000 miles above the earth and then used as a passive reflector for bouncing radio signals between stations on the ground.

The successful "*Project Echo*" experiment — conducted by the National Aeronautics & Space Administration, Bell Telephone Laboratories, and the Jet Propulsion Laboratory at Goldstone, Calif. — was marked by the transmission of a taped message by President Eisenhower which originated at the JPL station in Goldstone, was bounced off the balloon, and then received at the Bell Laboratories' Holmdel, N. J. installation.

In his message, the President noted the experiment as "*one more significant step in the United States' program of space exploration,*" and pointed out that it was being carried out "*for peaceful purposes for the benefit of all mankind. The satellite balloon which has reflected these words may be used freely by any nation for similar experiments in its own interest.*"

The successful transmission of the President's message took the world one step nearer the day when transoceanic telephone calls and live television programs might be transmitted via satellite.

In the first days of its flight, American's new *Echo I* satellite whizzed around the world every two hours charting new paths in communications for mankind.

The 10-story high radio mirror balloon, hailed by United States scientists as a step toward global television and inflated bases in space, on August 13 chalked a series of new "firsts" to its credit, including:

(1) The first simultaneous transmission-reception of recorded messages on a transcontinental relay between California to New Jersey.

(2) The first telephone conversation carried from coast to coast by way of the radio reflector.

As we see it, the recent successes of "*Project Echo*" officially ended the "Buck Rogers' era" and brought into reality what not too long ago was viewed as a wild-eyed dream, but which has become the center of more and more attention in the last several years as the promises and possibilities of a satellite communications system came into focus.

In fact, at this time it is clear that progress in the development of a space communications system has advanced in a relatively short time to the point where agencies of the government and industry concerned with the subject are now discussing some of the finer points in the promising imminency of such a communications system.

Although there *is* a recognition that obstacles *will* have to be overcome before a reliable satellite system can be put in operation, recent discussions in Washington, D. C., appear to indicate the *possibility* of a satellite system in the *near future.*

Scientists of Bell Laboratories have been investigating another possibility — "active" satellites, which would carry electronic equipment to receive radio signals and send them back to earth. Engineers are developing the rugged, long-life electronic devices and power supplies that would be necessary for a commercially feasible "active" satellite.

In recent testimony before the Federal Communications Commission, Bell System witnesses outlined a preliminary plan for a world-wide communication network utilizing active satellites. About 50 active satellites in random polar orbits at an altitude of 3000 miles could provide communications facilities between the United States and all areas of the world, Bell officials said.

This activity serves to make it clear that a new era in communications was opened as the President's taped message was sent coast to coast via the artificial earth satellite known as *Echo I.*

Of course we are pleased with the prospects of that future. However, we are equally pleased with President Eisenhower's statement that the experiment is "*being carried out for peaceful purposes for the benefit of all mankind . . .*" . . . That statement, we believe, correctly set the course for the new era in communications.

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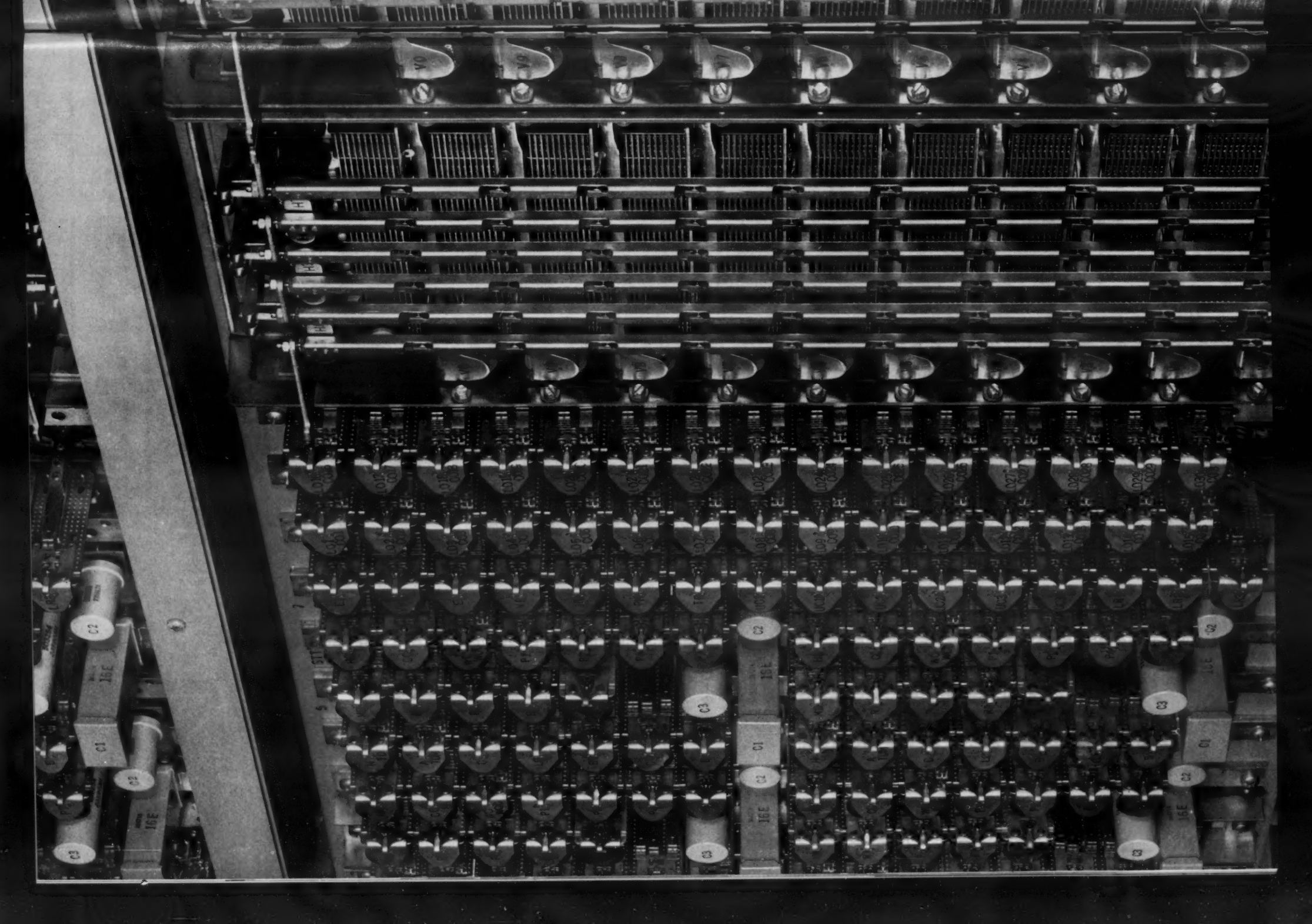
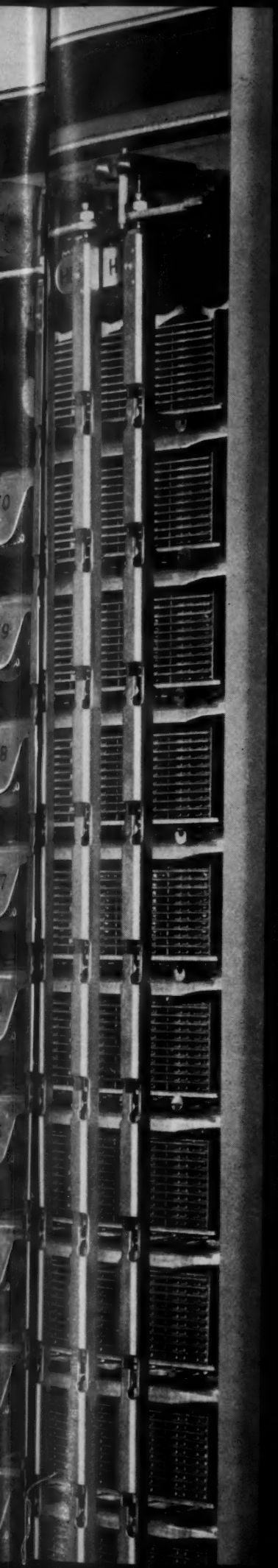




Crossbar efficiency and economy

FOR EXCHANGES AS SMALL AS THIRTY LINES!

with North NX-2 switchboards

Standardization of component modules, inherent in the application of a modular concept, has enabled North to bring to even the smallest exchanges the efficiencies and economies of crossbar switching, heretofore available only to large exchanges.

This modular concept, using a "building block" approach, makes it possible to literally "build" a switchboard, in multiples of 30 lines, to exactly meet your switching requirements. Tremendous economies in manufacturing standardized modules mean saving to you.

Most important of all—you are able to install a switchboard that incorporates the advantages and flexibilities of proved-in-use crossbar switching.

North NX-2 modular system is compact, easy to install, low in cost, designed for easy, inexpensive expansion and lowest maintenance ever. It represents the result of North engineering focused specifically on the requirements of small and medium size offices.

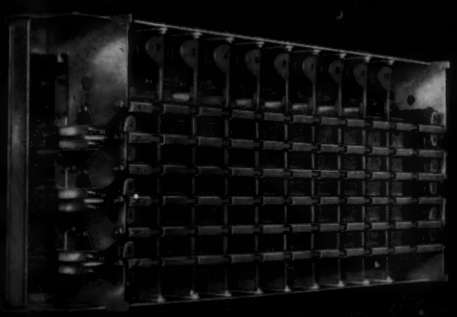
You'll want to know more about North NX-2—now.

For detailed information on North NX-2, write, wire or phone

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

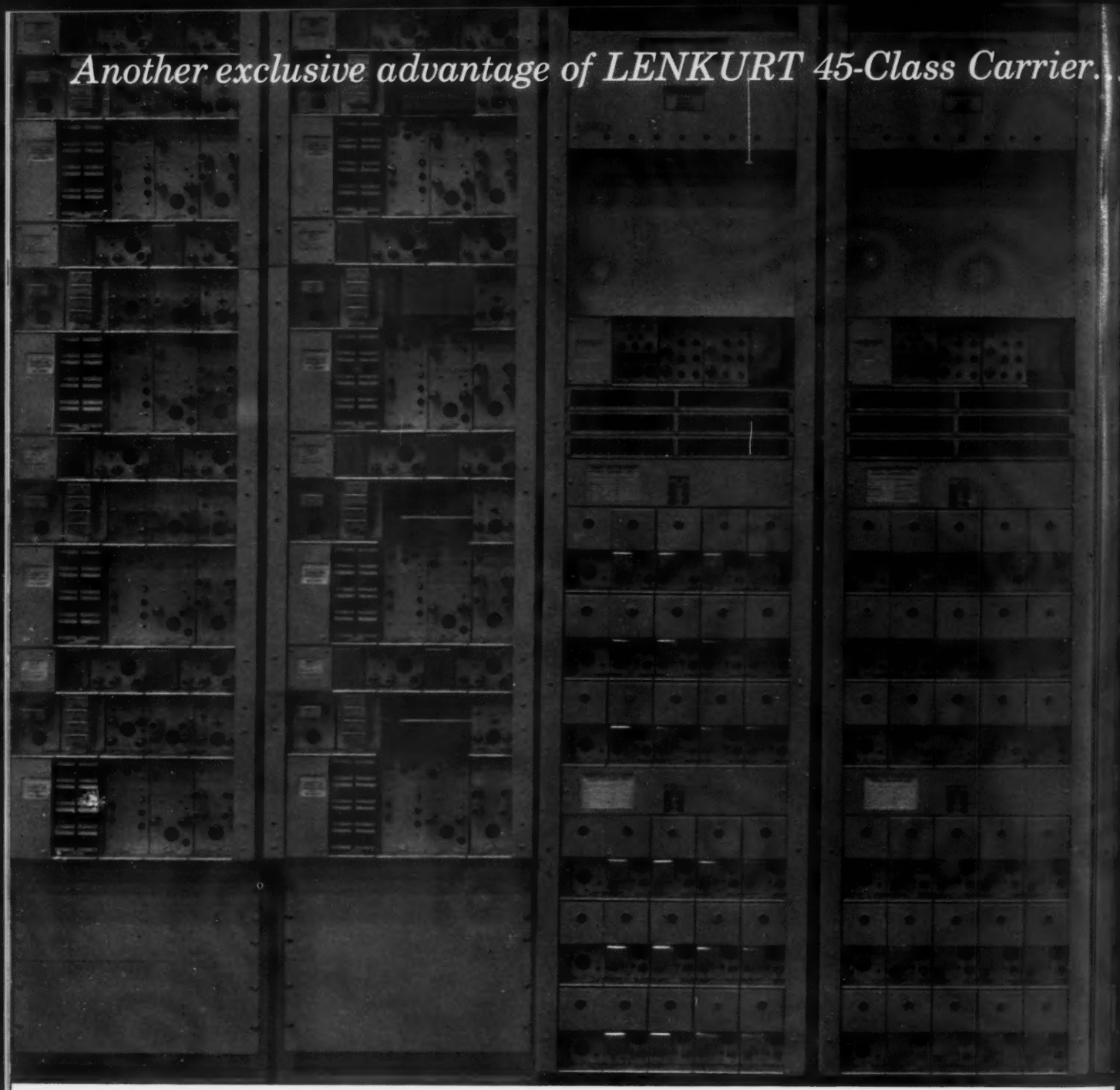
NORTH ELECTRIC COMPANY

Galion, Ohio



60-T-4

Another exclusive advantage of LENKURT 45-Class Carrier...

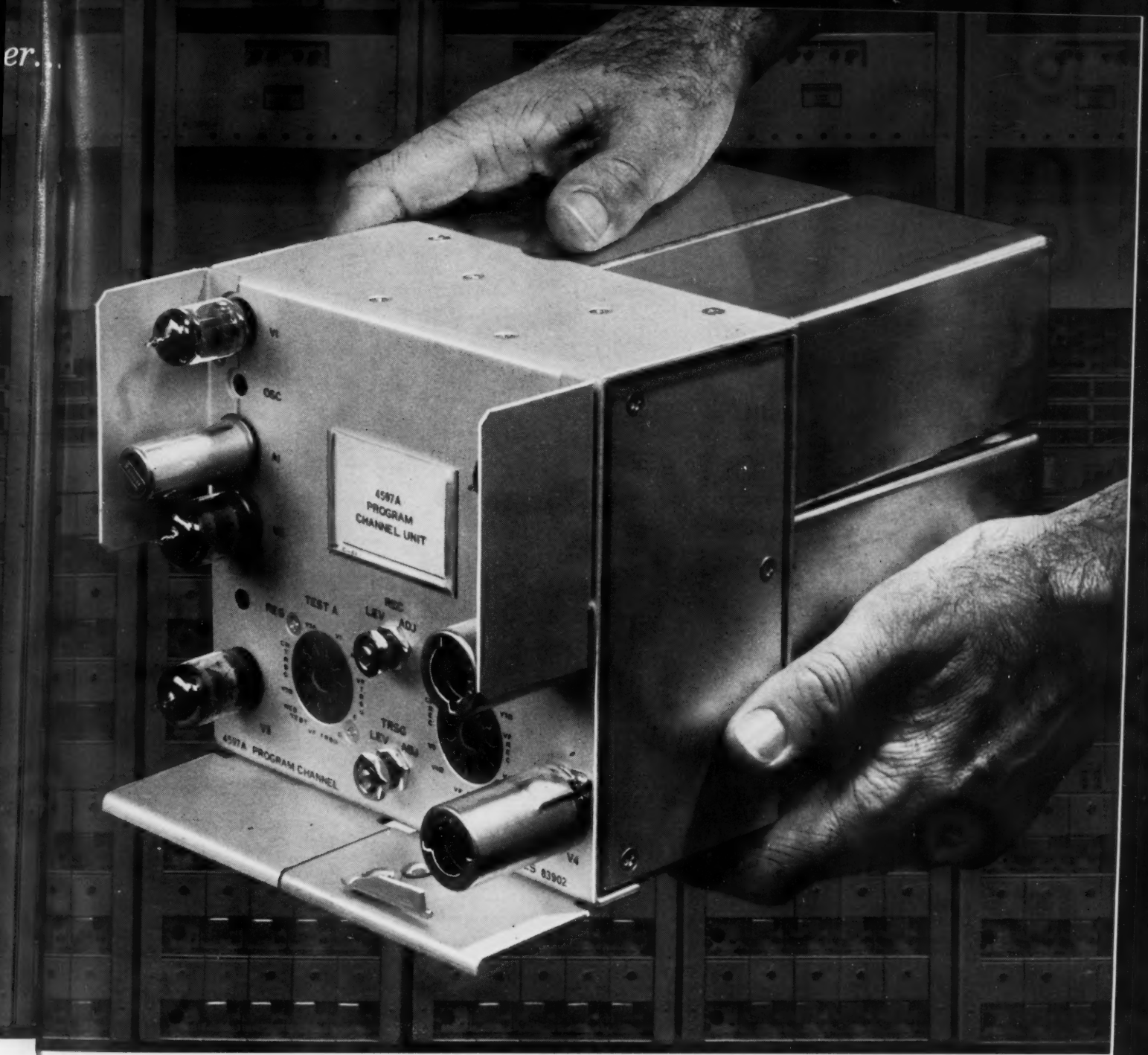


Lenkurt plug-in carrier channel units

More than ever before, the versatility of Lenkurt 45-Class carrier systems is paying off in cold, hard cash. Now you can offer service to the radio broadcasting industry for the transmission of Schedule A program material through *any* 45-Class installations.

Only Lenkurt provides these compact, plug-in carrier channel units. Basically inexpensive, they open up wide fields of additional revenue to many telephone companies.

The program channel unit (illustrated) occupies the physical space of two adjacent channel units in 45-Class



give you "Schedule A" program service

equipment. The compandor shelf and equalizer panel occupy only 8¾ inches on a standard 19-inch equipment rack. And the unit offers frequency response and level stability that are well within standards required for Schedule A program material.

This ability to offer a wider range of revenue-producing services based on existing equipment is only one of the many reasons why a million channel-miles of Lenkurt 45-Class Carrier is now in operation.

For more information about the Type 921A Program Channel Carrier Equipment, write or phone your nearest AE representative. Or contact the Director, Carrier & Radio Sales, at Automatic Electric Sales Corporation headquarters, Northlake, Illinois.

AUTOMATIC ELECTRIC

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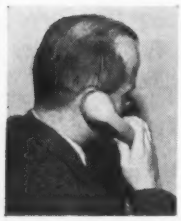
GENERAL SYSTEM

"Remember the missing horseshoe nail?"

JOE: How are you, Don? What can I do for you?



DON: Remember the old story about the missing horseshoe nail? It kept a king from getting to the battlefield on time—so he lost the battle *and* his kingdom! Well, Joe, I feel a bit like that king myself!

JOE: You mean you're in trouble unless you get some small supply items in a hurry?

DON: Exactly. So you'd better get me 150 C-clamps . . . 350 plastic splicing sleeves . . . 400 nicopress sleeves . . . a dozen rolls of two-inch tape . . . 100 half-inch plastic cable guards. And Joe—I'll be in town tomorrow morning, so I'll come over for the order.

JOE: Fine, Don. It'll be ready.

DON: Boy—I'm sure glad you're so well stocked and located so close by!

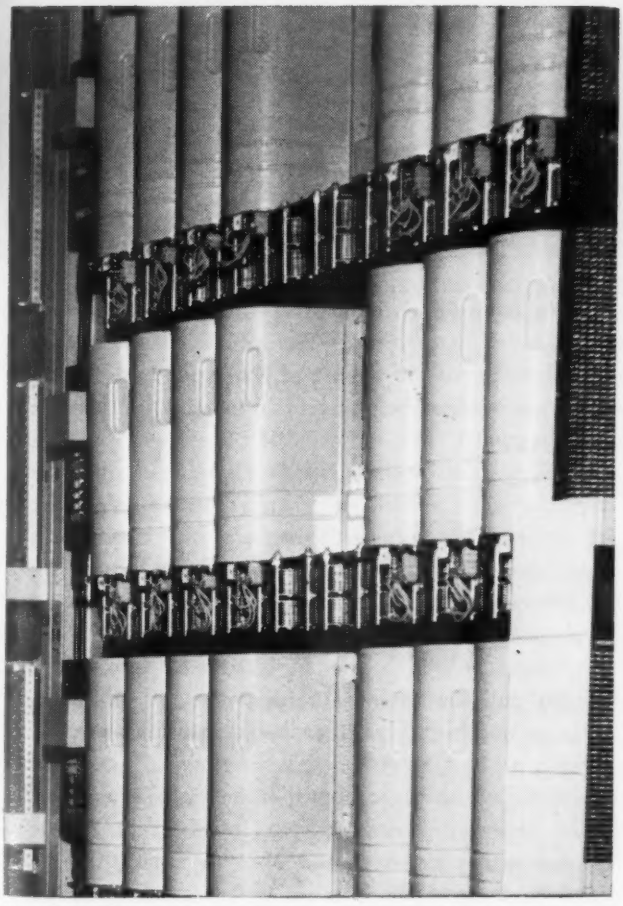
STROMBERG-CARLSON
A DIVISION OF **GENERAL DYNAMICS**

ATLANTA: TRINITY 5-7467; CHICAGO: STATE 2-4235; KANSAS CITY: HARRISON 1-6618; ROCHESTER: HUBBARD 2-2200; SAN FRANCISCO: OXFORD 7-36

By J. T. NAYLOR*
Vice President,
International Tel. & Tel. Corp.

THE INDUSTRY'S COMPETITIVE CHALLENGE...

There are few enterprises in our society that are fighting harder on more competitive fronts than the telephone business.



The long life and extraordinary magnitude of telephone investments require a special type of investor appeal — which is quite different from the "faster buck" varieties of commercial enterprise.

IN A SHORT 20 years the telephone industry in the United States has demonstrated two dramatic and, in a sense, contradictory trends. On the one hand the number of companies has diminished by 45 percent from 6,500 to 3,600. At the same time, however, telephones have increased by 240 percent and total revenues collected by almost 600 percent.

Many factors have been accountable for this integration of the industry into fewer units in the face of expanding business. Failure of markets has not been one of these reasons because, unlike other commercial enterprise, the service provided by any company must continue, one way or another, in any community through the same business instrumentalities. Only the ownerships have changed.

Acknowledging that some companies have dropped by the wayside because of serving obviously small and uneconomic units, I nevertheless venture the opinion that the merging trend has been primarily for another basic reason. This is because, in one or another of various aspects of the business, courage and determination have waned in meeting the competition in the game.

This may appear to be a strange observation about an industry noted as the most natural of all "monopolies" — the opposite precept from that of competition. In this, however, I submit an even more unorthodox view — that competition has not only been an important factor

**Mr. Naylor presented this address at the 1960 convention of the Oregon and Washington Independent Telephone Associations.*

in the consolidation of companies, and will continue to be so, but also that there are few enterprises in our society that are fighting harder or on more competitive fronts than the telephone business.

The telephone business has been tagged with the "monopoly" label, having its insidious and misleading inferences — by one circumstance alone. This is the simple, inherent fact — not a circumstance of choice or discretion — that if everyone in a community is to be able to communicate with all others from a fixed location, both physical feasibility and economic compulsion dictate a single and unified entity to handle the complete job.

Such inevitable single source of the service is spotlighted with a high order of responsibility. Its exclusive obligation and the absence of other sources of the same accommodation present the unique problems of public regulation as a substitute for having other competitive sources in the market area. Prices and service standards fall under public scrutiny and authority. The customer cannot express his dissatisfaction in his normal way by going next door or across the street to buy from another source. Thus, the spotlight falls on telephone rates and services and in some cases we serve as the backdrop for witchcraft in defining the simple meaning of a singular responsibility.

This exclusivity of duty is not immunity from competition nor is it monopoly in the genuine and full meaning. To the contrary, there are inherent features of the industry which aggravate some areas of competition to a degree abnormal to most other industry and compensating for any flavor of domination attributed to the business.

Telephone management is struggling competitively in three broad areas embracing innumerable day to day skirmishes. These are in the financial sector, in the talent sector and, of more recent years but on a "hot war" basis, in the marketing sector.

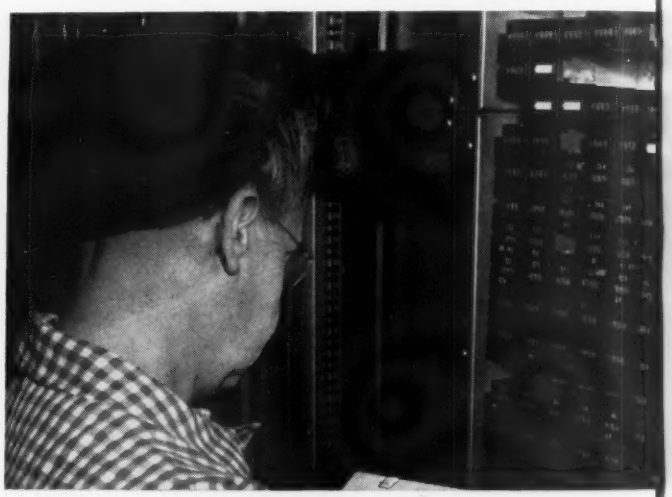
Competition, when it is not squarely and properly met, is the pressure which sells out companies, forces other companies into defensive stagnation and degrades public service standards and adequacy.

Meeting Financial Competition

SPECIFICALLY, and first, we may challenge any business to excel our commitments or problems in the investment field. The long life and extraordinary magnitude of telephone investments require a special type of investor appeal quite different from the "faster buck" varieties of commercial enterprise. In 25 years or more of plant serviceability many vagaries of economic cycles and possibilities have to be bridged. With a revenue-to-investment turnover averaging once each three years, the concept of investor appraisal ordinarily applied to average commercial activity, having turnover of two to three times each and every year, has to be remodeled. Until some rather bold facts are "sold" to the public, to regulation and to the investor, financial competition is an "uphill" proposition. I would like to brief some of these facts.

It may trend toward oversimplification but I am going to assert that successful competition for money primarily demands four basic areas of attack — (1) persuasion in the field of regulatory understanding and perception; (2) conscientious selling of stability on a long term basis; (3) foresight in maintaining an "open end" financial climate; (4) alertness in management and operations to keep all capital resources busy, to the exclusion of obligations on idle funds of property.

Enlightened regulation possesses the judgment equilibrium to appraise fairly and realistically all of the factors essential to growth and telephone service adequacy. You in the business, however, have the burden of keeping this regulatory fraternity current, fully informed and unmistakably reminded. In your heavy investment needs and long term outlook you must be insistent experts, as applied to our own companies' affairs, on the influence of money value erosion — gradual devaluation, on the current cost of money, on the impact of growth programs, on timing of corresponding financial expansion and on the aging of properties and the costs of replacement.



The physical and legal creature that is a company has only such life and is no more than its people and their abilities.

Superimposed on these informational responsibilities, telephone management must cultivate regulatory consistency and promptness. Sharp earnings declines and other "danger signals" are poisonous to investors. With the long term flavor and sluggish turnover feature of telephone service economy the resultant inflexibility can only be neutralized by demonstrating to both the risk investor and the lender a consistency and stability of earnings which defy all reasonable future events.

Time lag in regulatory processing can to some extent be offset by foresight, but *not enough*, when actual historical showings are required. Interim rate treatment and temporary relief should become an institution to offset famine periods. It is a management duty to shape such policy in line with all pertinent facts weighted by proper judgement.

Staying competitive in the *Please turn to page 56*

COMMERCIAL DEPARTMENT NOTES

By ALLAN R. STACEY
Vice Pres., Sunland-Tujunga Tel. Co., Sunland, Calif.

HANDY MANUAL OF FACTS AIDS SERVICE REPRESENTATIVES

Properly-planned manual helps service representative determine the customer's requirements and make helpful suggestions.

ONE DAY at a Rotary Club luncheon the chap sitting next to me asked what the charges would be to give him a local channel at a point a mile and one-half out into the rural area of our company. Local channel mileage rates were one of our tariff filings that I was unable to quote immediately and I had to promise to telephone him later.

On my way back from luncheon, I stopped in our public office and questioned one of our newer service representatives about local channel mileage rates. She, too, did not have the answer immediately in mind and turned to refer to our formal filed tariff volume. This is a formidable thing which often defies quick and ready reference and she was unable to quickly locate the section relating to local channels. Therefore, she turned to one of the older girls in the office and asked for information.

Some time later I was pleased to see that we had developed a service representative's manual and had provided each representative with a copy.

What Did The Manual Look Like?

THE SERVICE representative's manual was a small ring binder of black leatherette approximately 5" x 7" in size. This size is particularly helpful because it fits easily into the desk drawer and can always be close for ready reference. In addition, our commercial service engineer commented that he found it just the right size for use in the field because it would fit snugly into his coat pocket.

A personal copy is provided for every service "rep" and she is privileged to make her own notations on the pages and do anything with it that would be helpful for her usage. Let's see what's inside the service manual.

Inside The Cover

THE FIRST page on the inside contains the service representative's name and a calendar of the current year. On the second page we find the statement that the book outlines equipment rates and conditions available for improving service, public relations and revenues from the sales efforts of our company personnel. The page goes on to say that the book has been prepared for the service representative's individual use with the sole purpose of helping her to ascertain the customer's telephone service requirements and then make a recommendation which will convince the customer that the proposed arrangements adequately meet his needs.

On the third page is a table of contents showing the various classes of service and the official tariff number of the pages on which the tariff rates will be found.

Next we find a group of pages giving suggested answers to customer's objections. For example, we have the suggested answer for use when the customer says, "I'll think it over," or, "I'll have to talk with my husband."

The following pages contain simple summaries of specific tariffs ranging from one-party residence service through PABX boards.

Helpful notes are placed with each tariff quotation. For example, the semi-public coin box page has the note, "No off premise extension permitted — business service only."

In describing mileage rates, the manual attempts to give a brief description to increase the understanding of the service representative. For example, it states, "Mileage rates apply on all one, two and four party service including PBX PABX trunks and semi-public paystations located outside of the base rate area, but

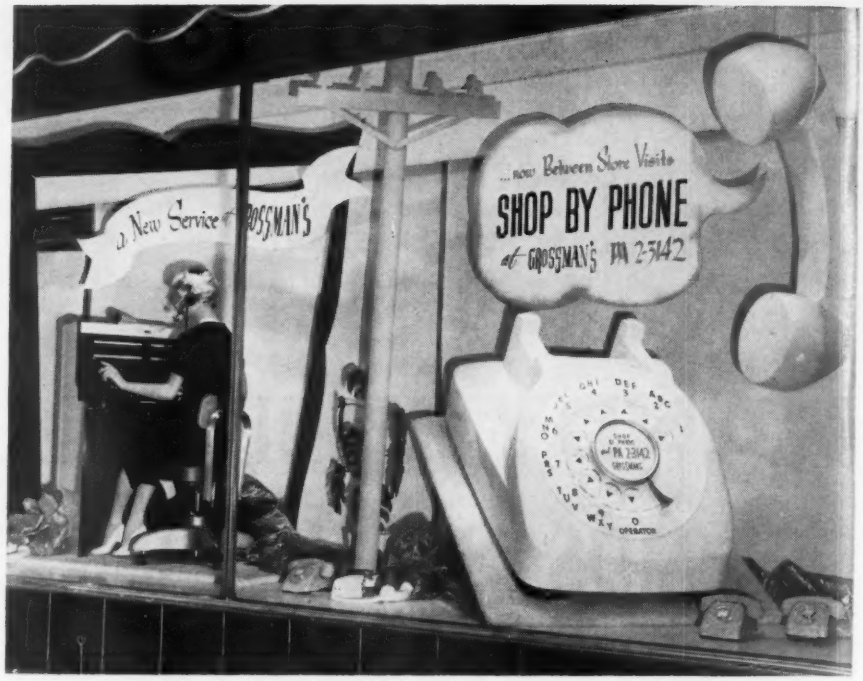
within the exchange area. This is termed exchange line mileage and is measured in quarter mile steps, from the station to the closest point of the base rate area, but within the exchange area. This is termed exchange line mileage and is measured in quarter mile steps, air-line, from the station to the closest point of the base rate boundary regardless of the route of the line to which the service connects."

The pages on mileage rates go so far as to provide some simple sketches indicating whether mileage rates apply when different buildings are on the same continuous property but are not over 300 feet apart.

When it comes to more complicated items of service, the service representative is told in her manual what the rates are, but a footnote states, "The above types of equipment and rates are shown for your information. Applications should be referred to your supervisor."

Where the service representative might encounter customer requests that require very detailed interpretations of the circumstances, the service representative's manual provides illustrations and quotes the appropriate tariff. For example, the manual not only states what the charges are for color telephone set installation, but describes what the service representative should do when the customer requests a change to a color handset from a black or between handsets of different colors. The manual also describes what to do when the customer states that he previously had a color telephone in another part of the state or country (some companies allow various kinds of credit).

The back of the service manual contains brochures showing actual colors of telephone instruments available and other pertinent information. In addition, in the back, are samples of contact forms to be filled out by the service representative under a variety of circumstances. For example, a sample form is shown completed for a move out-move in situation. Another sample form shows the proper charges and the proper wording for an inside move and change of instrument to color.



"Shop-by-Phone" is the message of this display window at Grossman's Department Store, Muskegon, Mich. Grossman's recently kicked off one of the first telephone shopping services in West Michigan. The "Shop-by-Phone" program was developed with the store by General Tel. Co. of Michigan. To make the service possible, Grossman's established a telephone sales department consisting of supervisory and sales personnel. The new department handles phoned orders from a special "Shop-by-Phone" number. Articles ordered by phone are delivered free.

Do The Service Representatives Like The Manual?

IN ONE of our training meetings, I asked the service representatives as a group whether they liked the manual and the response was an enthusiastic, "Oh, yes." The newer representatives told me that they used it very regularly and the more experienced representatives said that they wanted to have it available at all times.

When asked how the manual might be improved, the service representatives made several suggestions. They would like to see sample copies of the bill form included within the manual so that the newer representatives would have immediate access to descriptions of the special codes used on the bill to describe such items as service connection charges or previous balance which are coded rather than described with language on the bill.

The service representatives would like to see a section containing the account numbers or company internal account codes most frequently used by the "reps."

The service representatives would like to have a pure alphabetical index rather than the type of index which strictly follows the official tariff page numbers.

The representatives would prefer some method which would make the frequently used pages more immediately recognizable. This might be in the form of tabs in special colors or pages of particular color.

Any comments, criticisms, or suggested subjects for future topics? Address all correspondence to "Commercial Department Notes," Telephone Engineer & Management, 7720 Sheridan Road, Chicago 26, Illinois.

Next Issue

THAT'S all for now about the service representative's manual. Next issue we'll be talking about rate structures for pushbutton telephones (key systems). See you then. — *Allan R. Stacey.*

TRAFFIC LIGHTS

By D. A. PERIGO

General Traffic Supt., West Coast Tel. Co., Everett, Wash.

IS SUBSCRIBER OWNERSHIP OF EQUIPMENT GOOD OR BAD?

Here is Mr. Perigo's reply to the comments made in Allan Stacey's recent letter (see 8/1/60 TE&M) on station equipment ownership.

DEAR ALLAN: . . . In the June 15 issue of *Telephone Engineer & Management* "Traffic Lights" discussed "*Be Prepared for Obsolescence.*" From time to time "Traffic Lights" has said "*Our obligation is to stimulate thinking.*" Your open letter in "Commercial Department Notes" in the August 1 issue of TE&M indicates that at least one reader was so *stimulated.*

I'm real glad you raised some points about the article because they show the need for clarification and/or additional emphasis to what I previously wrote.

First of all, rather than "suggesting" that we sell our station equipment to our present subscribers, I raised a question. Later in my article I frankly confessed "*We don't know whether having subscriber ownership of station equipment is good or bad.*"

Secondly, I have no argument with your statistics or conclusions on the relationship of the 231 and 232 accounts to the "gross additions" — but my article didn't make any reference to anyone's entire construction budget. My reference was to "*the outside plant to upgrade our customers to one and two-party services.*"

I said it this way deliberately because I thought someone might point out that central office line equipment is also necessary in an upgrading program but did not anticipate relating it to gross additions. Perhaps I can say it a little better this way: *If we plan to upgrade our subscribers to one and two-party services it can be done by increasing the cable size of each outside plant job. How far would the* 231 *and* 232 *accounts go toward paying for the larger cable sizes?*

It seems to me upgrading is a job that faces us from public demand anyway — and subscriber ownership of station equipment would lessen the amount of new capital required to accomplish it.

"Our Birthright"

NOW as to "Our Birthright." Frankly I don't know whether the electric company would like to own the inside wiring, fixtures, and appliances, nor do I know whether the water company would like to own my bathroom facilities. I do know, as a result of some experience working for a regulatory body, that we regulated the rates that could be charged for electric service but we never told the electric company the price at which it was permitted to sell a range or a toaster. Today the regulatory body certainly includes our station equipment in the rate base and permits us to earn on it. The point here is, how do these earnings compare with what we could make through the "mark up" on selling station equipment?

Let's not overlook the point that with a subscriber-ownership system someone else may sell the station equipment rather than us. In that case the question becomes one of whether we are better off to have the lower over-all investment per telephone.

Next we'll pause on the "Loss of Control." There are quite a number of Farmer Line customers around the country where the subscribers own both the line and station equipment. Only rarely have I heard of cases where the subscriber refused to buy a dial instrument when the operating company outlined its plans for a dial conversion. This would be a similar situation.

Allan, the very things you mention such as push button telephones and

Tiawan Chief Operator Visits Rochester, As Part of Training Program

LEARNING the newest management techniques is the goal of Mrs. Hsi Mei Wu, chief operator of the Taipei Telephone Co. of Tiawan (Formosa), a recent visitor to Rochester, N. Y.

Mrs. Wu spent the month of June observing the telephone management procedures of the Rochester Telephone Corp., one of the country's leading Independents. While in Rochester, she also toured the telecommunication manufacturing facilities of Stromberg-Carlson.

Mrs. Wu's year long study of American telephone management methods, particularly traffic management, is sponsored by the International Cooperation Administration. Since January, she has spent at least one month with each of several large Independent telephone companies, observing their operations.

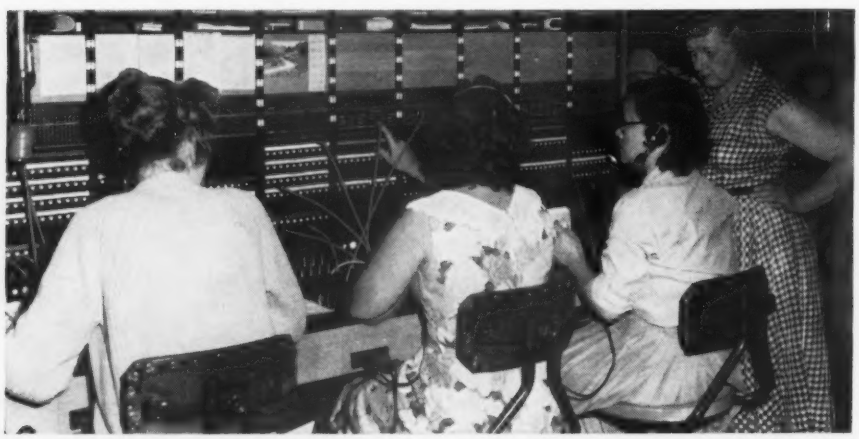
The role of management is not new to Mrs. Wu. In 1958, she assumed the position of chief operator and now supervises 136 girls. She came to Formosa from the China mainland 12 years ago and four years later began her career with the Taipei Telephone Co.

At Rochester Telephone, Mrs. Wu observed the operation of several departments in addition to traffic. She also visited many PBX installations of various sizes and types with Rochester Telephone Corp. PBX service assistants, Kay Brown and Marjorie Skeates.

MRS. HSI MEI WU, chief operator of Taipei Telephone Co., Formosa, discusses new "Petite" telephone with HOWARD STRASSNER, manager of manufacturing at Stromberg-Carlson's Rochester plant.

Mrs. Wu observed the 400 line XY-PBX at the Stromberg-Carlson plant, and toured the factory area where she showed particular interest in the "Petite" telephone assembly line and the departments making XY universal switches and receiver-transmitters.

The next step in the program planned for Mrs. Wu is a six weeks management session at Earlham College, Richmond, Ind. Among the Independents previously visited by Mrs. Wu are the Warren Telephone Co., Warren, Ohio; the United Telephone Co. of Indiana, Inc., Warsaw, Ind.; and the Jamestown Telephone Corporation, Jamestown, N.Y.



Mrs. Wu, second from right takes a spot on the switchboard at Stromberg-Carlson. At far right is MARJORIE SKEATES, Rochester Telephone Corp. PBX service assistant, who accompanied Mrs. Wu.

electronic switching are what cause the high obsolescence factor that is not properly reflected in our rates. An over-all depreciation rate of 5 per cent contemplates a 20-year life of the plant. With the advent of color, the *Ericofon*, the *Princess*, the *Petite*, etc., what is the life of our station equipment? Do the depreciation rates cover this?

You mention the high percentage of multi-party telephones in the Independent branch of the industry. It is much too high — and it is a serious problem which must be solved. Sometime take a look at the number of "busys" that occur in an office with high party line development and compare it with one that has a high one and two-party development.

We are kidding ourselves on the economics of party-line service. When a busy is encountered every item of equipment from the originating telephone to the connector has been brought into action with a useless result. I'll be saying more about this in a future article — but the point here is that I mentioned the possibility of using the present investment in station equipment to reduce the high party line development.

The problem of selective ringing is recognized, but *is there a problem when you have only one and two-party services?* Perhaps your opinions on this subject are influenced by the attitude of a regulatory body. There are states where the problem does not exist.

In the matter of stations working with automatic ticketing I suspect you are referring to the so-called "spotter dials" which, I believe, are more prevalent in Southern California than in other parts of the country.

"Advantage To The Customer"

AND, of course, this leads right in to the next point about advantage to the customer. Right off the bat I agree that the new subscriber must make an investment of his own — such as for three telephones if he wants them. Bear in mind, however, that with subscriber ownership our interest would be primarily in the line termination regardless of whether he wants one or three telephones. We

would connect to his residence for a monthly rate — *even if he does not have any instrument.* He might buy his telephone from us or his department store. Maybe this sounds bad, but what happens when a family with a gas stove moves into an area where there is no gas? What happens when the family with an electric stove moves into a house which is not wired for 220?

I'm glad you used the IBM example for ownership vs. rental. Why did it become necessary for IBM to make their equipment available on a purchase basis? What I have said about subscriber owned station equipment is that there are "signs that indicate the courts will eventually say the *subscriber has the option of owning or renting* his station equipment." This is exactly the IBM case, except for one very important thing — IBM is not a regulated industry. We are. My point is — I'm sure the obsolescence factor is well taken care of in the IBM rentals — and I'm equally sure it is not provided for in ours.

The Bell System is doing a big promotional job on selling the *Princess* at a favorable monthly rental. This is fine for additional telephones — but what happens where the customer says he wants one to *replace* what he already has? How is the obsolescence of the old set taken care of? Eventually it gnaws into the depreciation reserve — making a situation which is bad because of inflation infinitely worse.

Allan, I'm sure glad you wrote about this deal. I hope I have clarified things a little because, while I don't pretend to know whether it is good or bad, I am sure we shall all find ourselves facing the issue one of these days . . . Regards, *D. A. Perigo.*

Any comments, criticisms, or suggested subjects for future topics? Address all correspondence to "Traffic Lights," Telephone Engineer & Management, 7720 Sheridan Road, Chicago 26, Illinois.

CONVENTION QUOTES

"ADEQUATE EARNINGS"

ALL TOO many telephone companies these days are being hit from two directions. First, the rate bases they are allowed are too low, and second, the amount they are permitted to earn on that low rate base is also too low. It seems to me that all of us in the telephone business must keep hammering home the fact that a telephone company or any other company, regulated or nonregulated, must have adequate earnings if it is to keep on improving and broadening its service. This is the point to keep foremost in mind: Adequate earnings will, in the long run, enable a company to provide *better service* at a *lower price* than would otherwise be possible.

Each one of us has the prime responsibility for assuring that the public understands our earnings problem. This is a day-after-day job — explaining our problem to everyone who will stand still to listen, and running right alongside those who won't stand still to listen. Certainly, this is no easy job. No one likes an increased cost, even if we assure him over and over again that the cost will be less in the long run. But you can do a great deal toward minimizing misunderstandings, and you will be surprised at the support you will receive from the most unexpected places when you explain the situation.

A regulated industry is no place to hide your light under a bushel basket. We have a public to serve, and we are dedicated to serving them. But we can't do it unless our needs are recognized and unless we are permitted to solve our problems.

All of us say we're in the communications business, but that means far more than providing a good communications service. It means doing an equally good job of communicating our objectives, our problems, and our needs to the public, and to the representatives and servants of the public — the government.

Just how well are we telephone people communicating with the public — what kind of an impression do we make in the minds of the people who, in the final analysis, are in the driver's seat? How many times do we find ourselves on the defensive, communicating only because we have been forced into it, only to find that the public is vitally interested in our story and welcomes what we say? How many times have we found that our so-called opposition isn't opposition at all, but simply are people just like us who don't know our story because we haven't told it to them — and by "story" I don't mean slanted, self-serving information, but *facts*, objective facts that speak for themselves. — *Adapted from address presented by DON G. MITCHELL, president, General Telephone & Electronics Corp., at annual meeting of Theodore Gary Chapter, Independent Telephone Pioneer Association.*

PLANT ENGINEERING NOTES

By JOHN S. REED
Technical Editor, TELEPHONE ENGINEER & MANAGEMENT

NEW METHODS DEVELOPED FOR JOINING CONDUIT SECTIONS

Through field tests at Peoria, the Illinois Bell hopes to determine the best method for jointing concrete conduit sections.

CONCRETE conduit has been coming into increasing use for telephone underground conduit and a great deal of this kind of conduit has been laid within recent years. There is, however, yet a need to determine the best kind of joint for the sections of concrete conduit.

According to a report in the *Illinois Bell News*, tests are being carried out in Peoria, Ill. to ascertain the most satisfactory jointing for conduit sections. The several types under consideration are (1) the concrete bell and spigot conduit pioneered by Illinois Bell in 1956, (2) double tenon conduit made under Bell Telephone Laboratories specifications, (3) and (4) two types of mortise and tenon joints. These four joint types are illustrated in *Figure One.*

The bell and spigot has the advantage of using thinner walls and therefore weighs less. Sections in the test are three feet long and have six ducts, for cables. Laying procedure consists of inserting the plain end of one unit into the bell end of another unit. To seal the joint, the workman applies a bituminous mastic material to the bottom of the bell before it is lowered in the trench and completes the caulking after the units are jointed as shown in *Figure Two.*

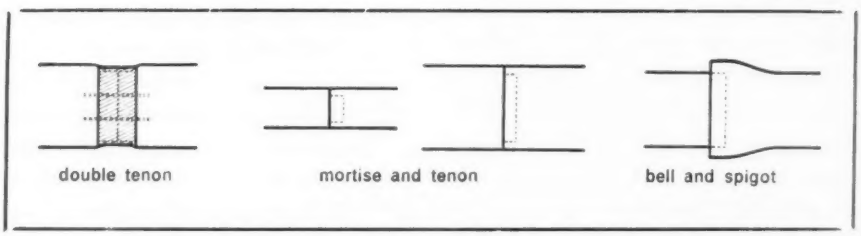


FIG. ONE: — Four types of joints for concrete conduit.

In the double tenon arrangement, both ends of these three and one half foot sections are the same, slightly tapered to accommodate a tight-fitting polyethylene connector band as shown in *Figures Three and Four.* Dowel pins are also used in connecting the sections. The type of conduit used in the test has six ducts.

FIG. TWO: — Sealing bell and spigot joint on concrete conduit.

The mortise and tenon conduit, both of three-duct and six-duct construction, has each section made with a recessed end and a protruding end so that when joined in a row, the outside of the conduit is straight. A mastic material is applied to the tenon end before the units are joined to provide a sealed joint as illustrated in *Figure Five.* This type of conduit requires a thicker wall structure and is therefore heavier. Because of this, lightweight aggregate is employed in all four types of concrete conduits used in the test. The three-duct conduit is used extensively by the Long

Island Area of the New York Telephone Co., but because the Peoria trials called for a six-duct formation, two units of this type were placed concurrently in the trench as indicated in *Figures Six* and *Seven*. Both the three-duct and six-duct sections were 3 feet in length.

Approximately one-fourth of the 83,000 duct-feet of experimental conduit laid in the Peoria project was a modified version of the clay tile conduit used for years. However, the newer tile has slightly thinner walls and the length of sections was increased from three and one-half feet to five feet. It was used mainly as a control factor for the concrete conduit.

Archie Gagne of Franklin Park, Ill. conceived the idea of concrete conduit and proposed it first to Illinois Bell's Midstate Division construction supervisors. He told the idea to this company, developed a machine to extrude concrete conduit, and started his own company to manufacture it.

Chicago Precast Products Corp., Naperville, Ill., a company formed by Gagne, manufactured two of the concrete conduits used in the Peoria test bell and spigot and six-duct mortise and tenon. Concrete Conduit Corp. of New York is the manufacturer of the three-duct mortise and tenon conduit. The double tenon conduit was manufactured near Kansas City, Kansas, by a licensee of the Nordix Corporation of Bellaire, Texas.

FIG. THREE: — Removing protective covering from double tenon joints conduit ends.

FIG. FOUR: — Placing polyethylene connector band on double tenon.

FIG. FIVE: — Applying mastic to mortise and tenon.

FIG. SIX: — Laying 3-duct mortise-and-tenon conduit.

FIG. SEVEN: — Six-duct mortise-and-tenon conduit in uphill trench.

Tone and Continuity Tester

THE TEST unit illustrated in *Figure Eight* is designed for use by linemen, cable splicers, telephone and PBX installers, and central office installers. It is designed to trace dead drops, block wiring, key system circuits, and switchboard wiring. By operating a switch, its circuit is changed from tone generator function to continuity test application.

Although priced economically, it has a rugged construction and is compact and light weight (30 ounces). It makes use of printed circuitry to reduce maintenance. An adjustable buzzer operating from a 4½ volt "A" battery provides tone cur-

Please turn to page 42

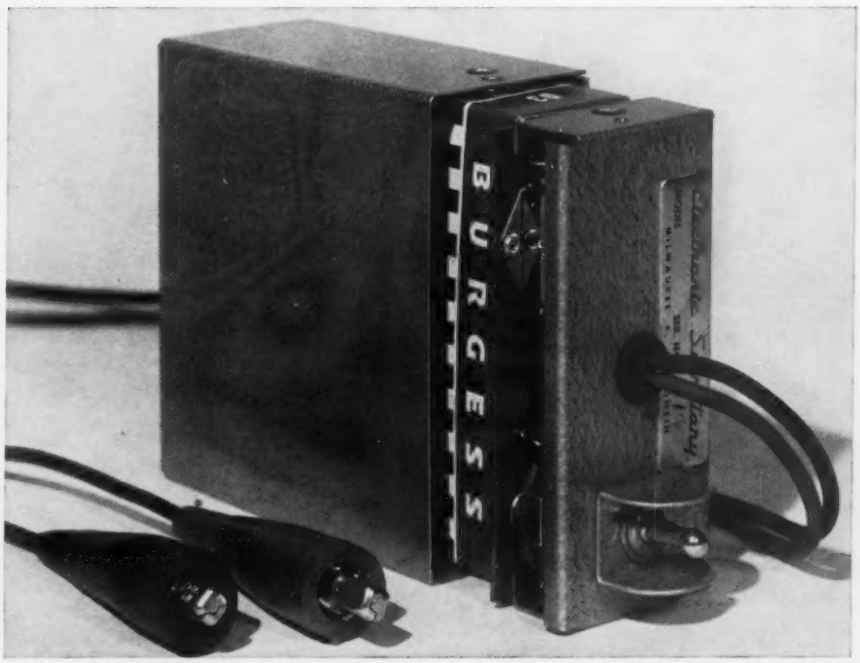


FIGURE EIGHT: — Tone and continuity tester features printed circuitry. (Electronics Secretary Industries, Inc.)

BUT
I want both!

If you're ready for P.P.C.S.* addition to your XY® Type 40 Toll Ticketing system now, we're ready to quote on it. Or if you choose only station-to-station equipment now, you can easily add P.P.C.S. at any time in the future. With a Stromberg-Carlson Type 40 system you can have your cake and eat it, too!

The economics of it "proves-in" today or tomorrow. Since Stromberg-Carlson P.P.C.S. means only minor additions to your Type 40 system, you're actually pre-paying the additions out of present earnings on station-to-station service!

With or without P.P.C.S., XY Toll Ticketing is your best insurance for greater operating profit. Using magnetic tape, the system is fully automatic . . . manual attention is at a minimum. No need to change or transfer tapes . . . tapes are re-used again and again. The system is centralized and self-contained, provides readout where you want it, at your convenience, and under your control.

Want the full story on station-to-station and P.P.C.S. XY Toll Ticketing? Get in touch with your Stromberg-Carlson representative. In Atlanta call TRinity 5-7467; Chicago: STate 2-4235; Kansas City: HArrison 1-6618; Rochester: HUbbard 2-2200; San Francisco: OXford 7-3630.

**Person-to-Person, Collect, and Special Service.*

STROMBERG-CARLSON
A DIVISION OF **GENERAL DYNAMICS**

QUESTIONS and ANSWERS

QUESTION: — *What is the cause of music or speech heard when a subscriber is using the telephone? We have complaints from some of our customers on this interference.*

ANSWER: — This might be cross-talk from radio program circuits operating at too high a transmission level. However, if the subscriber stations are near a radio station, it is quite likely that the radio frequencies from the station are being demodulated by the telephone set components or possibly by a corroded or loose connection of the station or drop wiring. Non-working drop wires or unused station wires still connected may also cause pickup of the radio frequency energy.

Telephone set components that may cause the demodulation or rectification of the radio frequency currents are carbon granules in the transmitter, or varistor unit in set network or across the handset receiver. The manufacturer of the telephone sets should be consulted for filter units that will suppress the radio frequency currents. Filter components will differ with the frequency of the radio transmitter. High or amateur frequencies, or low or broadcast frequencies require different types of filters.

QUESTION: — *What is the difference between a "zener" diode and a "tunnel" diode?*

ANSWER: — Both are semiconductor devices. The zener diode is a reversed bias PN junction type made from silicon with an impurity such as boron added to create junction material of the PN type. A reversed or back bias condition is obtained by connecting negative battery to the positive side of the junction and positive battery to the negative side. A small current is produced which is relatively constant up to a critical value of the reverse voltage. Above this point the current conduction across the junction suddenly increases to a high value.

This change from non-conductance to full conductance is very sharp, resulting in the "Zener Knee" characteristic. Curiously, the voltage drop across the junction remains constant in spite of the sudden jump in current flow. A similar effect is obtained when the diode is connected in the forward direction, but the current rise occurs sooner with a low voltage value, a higher current and less steeply rising characteristic.

The tunnel diode is a heavily doped junction type with a negative resistance characteristic over part of its operating range. As the voltage across the diode is increased, the current flow or conductance rises to a peak and then falls to very nearly zero. Further increase in the voltage seems to produce no result until a point is reached where the current again increases and continues to rise as the voltage is made greater. Zener diodes are useful in applications for rectification, surge and overvoltage protection, voltage regulation and pulsing. Tunnel diodes have the characteristic of high speed operation of the electrical charges as compared to slower motion of electrical charge carried in ordinary transistors. They can thus be employed to produce frequencies higher than 2000 megacycles. They are extremely fast when used as switches, being capable of operating in a fraction of a millimicrosecond. With its negative resistance characteristic, the tunnel diode can be used as low noise amplifier and as a high frequency oscillator.

You are invited . . . to tell TE&M authors your problems of department policy or procedure on which you'd like to have an opinion.

rent for tracing circuits and an audible indication of continuity in point-to-point tests. The battery has sufficient capacity for 42 hours of continuous operation (by laboratory tests). The case can be readily opened by removing two screws for replacing the battery.

A canvas case with adjustable strap is available for carrying the test set.

Operator's Amplifier

MUCH OF THE good service provided by the telephone operator depends on her ability to hear distinctly. Noise conditions can be distracting, and individuals vary in hearing acuity. These were some of the factors which influenced the Bell Telephone Laboratories in developing a small and efficient amplifier for individuals who have difficulty in using the normal equipment efficiently. The amplifier works with central office switchboards, private branch exchanges and test desks.

The new device, measuring 1¾ by 2 by 3 inches, is an auxiliary unit (*Figure Nine*) that plugs into the switchboard and contains jacks for accommodating the plug of the operator's headset cord. She turns a small knob which controls the amplification level. The amplifier makes use of the junction transistor, which is especially well suited for the operator's amplifier because it is small and obtains the little power it needs through the switchboard.

FIG. NINE: — MRS. ROSE MARY DIXON, private branch exchange operator at the Indianapolis Works of the Western Electric Company, is shown demonstrating one of the new transistorized amplifiers for operators.

SUB-HARMONICS and OVERTONES

By C. D. EHINGER
Pres., Citizens Tel. Co., Decatur, Ind.

NEW UNIT REDUCES LADDER TIME FOR CENTRAL OFFICE TECHNICIANS

This TE&M Lab Report describes a clever new unit that automatically adjusts to the proper voltage range.

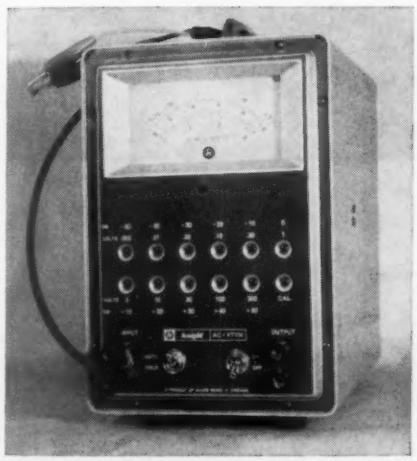


Fig. A: — The completed Knight-Kit ACVTVM (Knight 83 YX 608). This unusual instrument automatically switches to the proper range and has many features which will appeal to the central office technician.

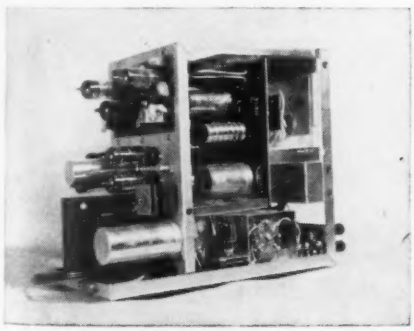


Fig. B: — The first input stage is shock-mounted to eliminate microphonics, and the automatic range switch is shielded as a precaution against extraneous voltage pickup.

I DOUBT if very many of us have ever thought about one item that is somewhat peculiar to our industry. I refer to the fact that many of our technicians spend a considerable amount of time on a ladder. Before any of you start writing letters to me asking "just what kind of lineman are you talking about who would use a ladder rather than climbers," I wish to make it clear that I am referring to the technicians in our *central offices* and not those in our outside plant.

But, whether you are using 9-ft. frames or 11-ft. frames in your central office, requiring either portable ladders or rolling ladders (and don't get me started on the relative merits of either height — we'll get into that one in some future articles), no one can discount the fact that performing technical work, while standing on a ladder, is not exactly a bed of roses.

Take the case in which a carrier, as an example, is mounted at a height which can be reached only while standing on a ladder. Let's further assume that voltage checks are to be made. It is sometimes possible to position the test equipment at a point where it is fairly handy. However, the opposite case usually prevails and the technician must make his voltage check, read the meter, and usually notate the results. Invariably, when he moves to the next voltage point, he must move up or down the ladder, set the meter to the appropriate scale, climb back up and make his new reading and notation. This cycle is usually repeated over and over during the course of a series of voltage checks.

"An Exasperating Experience"

I THINK that it would be a safe bet, with any of you who have ever had to go through this exasperating experience, to state that you have often wished for an instrument that would automatically adjust itself to the proper voltage range without the necessity of the operator going through all of his ladder gymnastics.

In the last few months, the Allied Radio Corporation of Chicago has developed and placed on the market an extremely clever and versatile a.c. vacuum tube voltmeter which does exactly what you and I have wished for — it automatically selects the proper range for the voltage under test and indicates, by means of a pilot light, the particular scale which the

Promoting a new concept— Home-Wide Telephone Convenience

12% of America's families have incomes of over $10,000 a year.

Nearly 10% live in homes with 4 or more bedrooms.

By and large these families lead active social and business lives, and they use their telephones a lot.

For these reasons they are excellent prospects for extension service which will provide handy telephones wherever needed—in all of the working, sleeping and playing areas of the home.

We call this broadened service Home-Wide Telephone Convenience, and a current Bell System advertising campaign is promoting it in the magazines that reach the largest number of our prospective customers: *House & Garden*, *House Beautiful*, *The New Yorker* and *Town and Country*.

This advertising, in full color, is enlarging the extension market for the entire industry. It will help telephone companies everywhere to sell their customers service which is more useful, convenient and enjoyable than ever before.

BELL TELEPHONE SYSTEM

unit has selected. In addition, its sensitivity is sufficient for readings from — 65 dbm to +52 dbm. The unit is also flat from below 20 cps to an upper limit in megacycle ranges, which also makes it suitable for transmission testing from the voice frequency range to ranges far surpassing our present highest carrier frequencies.

"Foot-Weary Technicians With Sore Thumbs"

WITH SUCH specifications, it most certainly appears that the unit will find wide application in our industry with a special appeal for foot-weary technicians who have developed sore thumbs from manually changing range scales as voltage requirements dictated and, also, as a precaution against "pinning the needle" in other ranges.

The instrument is supplied in kit form and one was sent to the TE&M labs for assembly and checking.

A front view of the completed unit can be seen in Illustration A. The two toggle switches on the front panel are for ac power on and off and to control the unit as to whether the automatic range selection feature will be in effect or whether one particular range will be maintained regardless of the limits of voltage to be measured. A shielded cable, terminated in alligator clips, is used for test leads and this cable is, in turn, terminated in twin banana plugs which are inserted in the input jack on the left side of the panel face.

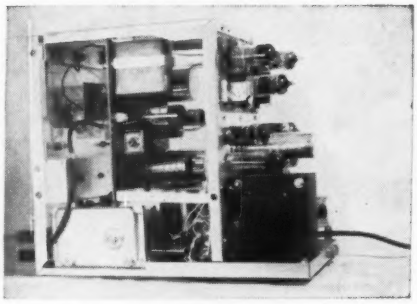


Fig. C: — Printed circuit boards are used extensively and assembly is comparatively simple.

The two terminals on the right-hand side of the panel face marked "output" are for the use of auxiliary equipment, such as an oscilloscope, for visual inspection of the wave form of the voltage under measurement. Incidentally, loading of the "output" jacks has no appreciable effect on the wave form under question. The row of lights in the middle of the panel face are pilot lights which indicate the scale which has been automatically selected by the meter.

Time To Assemble

AFTER receipt of the kit, it was assembled in the TE&M Lab. Eighteen and one-half hours were required to bring the unit to the point where it was ready for final calibration.

Illustrations B, C, and D show the unit with the case removed and indicate the compactness and rigidity which are features of this particular kit. Printed circuit boards have been used rather liberally, which makes for quick and uniform assembly. The input stage and a part of the ampli-

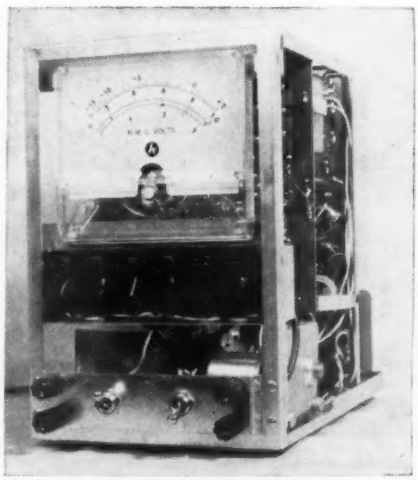


Fig. D: — The meter face is large and easily read. Measurements from —65 dbm to +52 dbm can be made with the instrument.

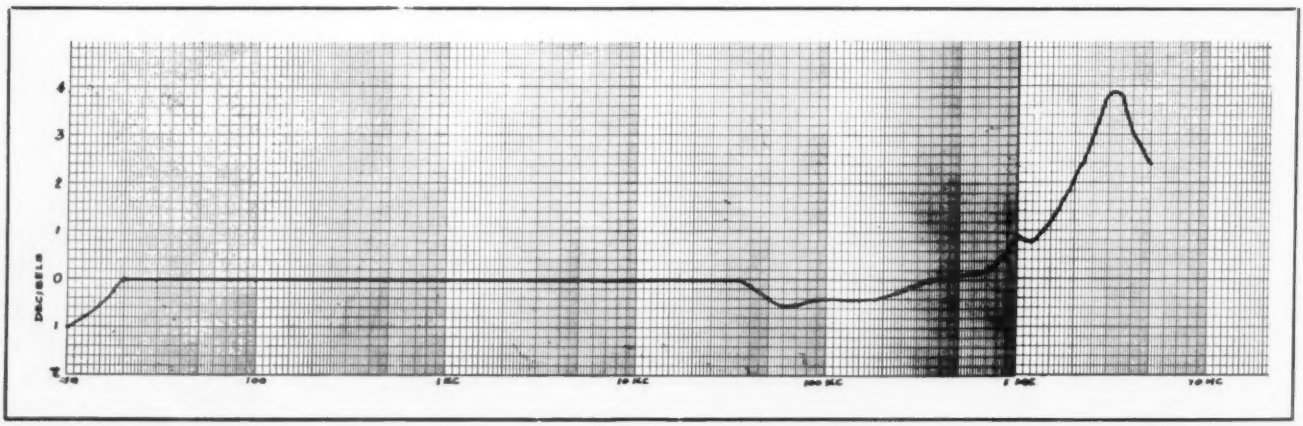


Fig. F:—A frequency response curve for the instrument was run by the TE&M lab. (See text for additional information.)

fier are shock-mounted as a precaution against microphonics which could contribute to false voltage readings.

A 1N461 diode is shunted directly across the meter to prevent damage to the meter movement when high voltages are placed on the input lead with the selector switch on the lowest range (.003 volts full scale). The specifications of the unit are as follows:

Size	10¼" high 6⅝" wide 10¼" deep
Weight	13½ lbs.
Tube Complement	3 6DK6 2 12AT7 2 6DR7 1 6AW8A 1 12AX7 1 EZ90 1 5651

Meter Accuracy
With line voltage of 115 volts ± 10%, meter accuracy within ± 3% across the full frequency ranges

Input Impedance
On 3 to 300 volts, 10 megohms shunted by 15 mmfd. On .003 to 1 volt, 10 megohms shunted by 25 mmfd.

Voltages
Full scale meter readings of .003, .01, .03, .1, .3, 1, 3, 10, 30, 100, 300 volts

Decibel Scale and Ranges
From —65 dbm to +52 dbm (zero reference level = 1 milliwatt into 600 ohms)

Calibrating the Meter

A CALIBRATION unit is supplied with the kit to be used in final setting of the unit. This calibration assembly provides two separate voltages (.0006 and .0031 volts). This unit can be seen in Illustration E and was mounted on the interior of the rear cover panel and wired to output jacks constantly available on the rear panel. A toggle switch was also mounted to allow the calibration unit to be cut out when not in use. It should further be mentioned, at this point, that such a calibration unit is an extremely valuable adjunct to have available in any central office equipment room for use in standardizing the calibration of all ac voltage measuring equipment.

After final calibration, the unit was sent to the TE&M lab for a response curve. A graph of this frequency response curve can be seen in Illustration F. As can be seen from the graph, the unit is flat within ± 1/2 db from 15 cps to very nearly 1 megacycle and is within ± 1 db from 10 cps to about 1.3 megacycles and can give useful readings to at least 5 megacycles. Response characteristics were not checked above 5 megacycles.

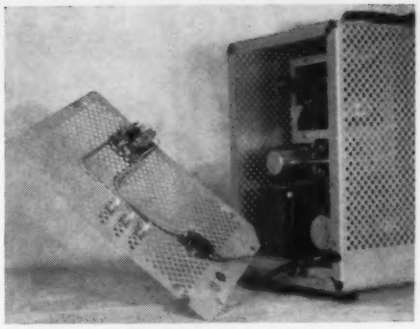


Fig. E: — A voltage calibration unit accompanies the kit. For the purpose of this article, the calibration kit was mounted on the rear panel as shown. Calibrated voltages are available through three output jacks.

It is an amazing experience to use this instrument. With the output probes merely lying on the workbench, a person approaching the unit will cause it to automatically switch to the appropriate voltage range even though the human body is still many inches away from the probes. With the unit in the .003 volt position, the probes can be placed across a 300 volt source and it automatically switches to the 300 volt range (in about 3½ seconds). Try that on the usual meter and you wind up with nothing but a "burnt-odor" in the equipment room!

It would appear that this unit has wide and varied uses especially for our "cliff-hangers" in the telephone equipment room. — *C. D. Ehinger.*

—73—

Any comments, criticisms, or suggestions for future topics? Address all correspondence to "Sub-Harmonics and Overtones," Telephone Engineer & Management, 7720 Sheridan Road, Chicago 26, Ill.

Manufacturer's Comments

C. D. EHINGER has certainly hit upon an unusual and unique application of our Knight-Kit AC VTVM that had not previously occurred to us. However, its principle reason for existence, that of a general purpose automatic AC VTVM, still seems to make it a desirable instrument to have in a telephone office service shop the same as in any other service shop. AC measurements may be made on equipment with one hand while notes may be made with the other. No "3rd hand" is required to manipulate a manual switch. Your two hands are free to make rapid measurements and notations of AC voltages.

An ideal application of this instrument is its use in an AC bridge. It is the best "null" indicator we know of. It is insensitive when the bridge is way off balance and automatically increases in sensitivity as the bridge is brought to balance.

Mr. Ehinger mentions 3½ seconds switching time from the lowest range to the highest. The average on our units is 2½ seconds. Even more important is the fact that the operating DC motor is reversible and average access time runs only about one second.

In addition to the output terminals which permit the simultaneous use of an oscilloscope, keep in mind that the automatic meter range switching is also automatically adjusting the vertical antennuator on the 'scope. In this way, you are saved the labor of adjusting the verticle control on the 'scope when observing wave forms.

The built-in amplifier also serves as a 34 db gain wide-band amplifier separately for other uses. It makes an emergency video amplifier, for instance.

We at Allied Radio are quite excited over the field response we have had on this instrument so far. Other available wide-band AC VTVM's run $200 to $300 and are not automatic. Because this is a kit and you supply the labor, you can provide your shop with a laboratory AC VTVM that is automatic for only a little over $100. — *ALLIED RADIO CORP.*

You are invited . . . to tell TE&M authors your problems of department policy or procedure on which you'd like to have an opinion.

THIS **LEICH** PABX
FEATURE
SELLS
BUSINESS SUBSCRIBERS

Stock Delivery Program

LEICH
Subsidiary of
GENERAL TELEPHONE & ELECTRON

ermits Fast Installation

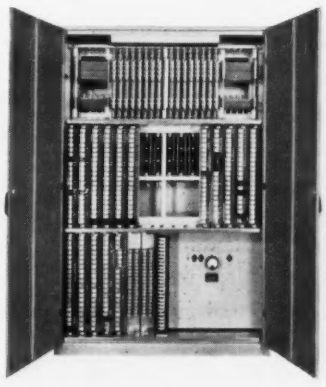
of LEICH 40A and 88A PABX's

It's a comfort to know you can sell a LEICH 40A or 88A PABX **and get delivery from stock.** This means your customer can start getting the benefits of these modern new PABX's almost immediately. What are some of these benefits?

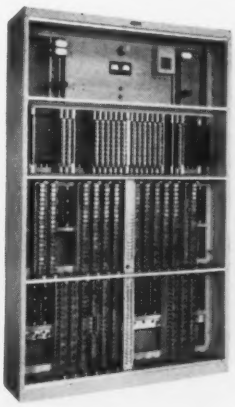
There's tremendous space-saving, all-relay equipment, lightning-fast call extension, a wide variety of service features and a low price tag. It all adds up to unusual quality and efficiency for your subscriber.

Write for a copy of the LEICH PABX Sales Kit that helps you sell more business subscribers.

12-trunk turret for Leich's 40A and 88A PABX's.



Switchboard Bay for Leich's 40A PABX handles 40 lines, 6 links, and 10 city trunks.



Leich's 88A PABX uses all-relay switchboard with 88 lines, 9 links, and 10 city trunks.

EICH SALES CORPORATION • 427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS

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manufacturers of telephones, switchboards and related apparatus since 1907

New Products' Showcase

SUPPLIES AND EQUIPMENT

By DICK REYNOLDS

Business Telephone Service

A NEW business communications tool, the "Call Commander®" telephone, plus new intercom services have been announced by Automatic Electric Co. These two features expand the facilities of the company's 10-A1 key system, a complete push-button telephone network.

The Call Commander, a multi-line telephone equipped with a maximum of 18 pushbuttons for outside line and intercom service, gives the businessman three times the number of buttons offered by standard key telephones.

By the push of a button, the user can access up to 18 central office or PBX lines. Pushbutton operation also will hold up to 17 central office or PBX lines. The Call Commander telephone permits several methods of signaling, including code and selective (either dial or pushbutton controlled) for intercom stations. Lighted plastic pushbuttons serve as line signals. The telephone is available in jade green and sand beige with a choice of five contrasting face plates. Coiled cord and plug-in connectors are standard equipment.

The heart of the expanded 10-A1 key system is the intercom service. Providing selective signaling for up to 36 intercom stations, it also offers a pre-set conference service whereby six people may be called simultaneously by either dial or pushbutton. Other optional features include add-on conference service to allow persons within the system to join an outside call, privacy on intercom calls, and a camp-on device to reserve a busy line and automatically connect the caller when the line is free. A "long-line" feature connects an off-premise station to the intercom service.

Relay equipment for both the 10-A1 key system and intercom service will be available in individual units mounted on plates with screw-type terminals for flexibility and economy. A hinged equipment gate allows easy access to the terminals in the relay cabinet, which is designed for wall mounting. The assembly, protected by a fiberglass cover and lined with sound-absorbent material, is 25⅝" x 17⅛" x 9½". *Check NP* 495.

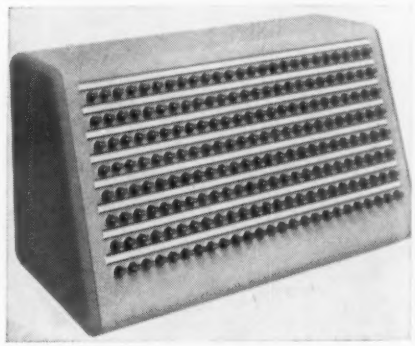
New Call Commander Telephone From Automatic Electric Co.

Message Waiting Service

GETTING MESSAGES to busy hotel guests can now be handled by a new telephone service provided by Automatic Electric Co.

The "message waiting" service features a flashing lamp on the guest's room telephone which informs him that a message is on hand at the PABX switchboard. The lamp is triggered by turn of a key.

In small hotels, the locking turn-keys are mounted on the switchboard, one key for each telephone. In larger establishments, the PABX attendant may be freed of handling message waiting calls by a special Message Service Control Unit. The compact cabinet contains keys for 100 or 200 phones. Additional units may be provided when more than 200 telephones are to be served. When the PABX attendant receives a request to deliver a message, the lamp on the guest's



phone may be activated, or the call routed to the Message Service Control Unit. By calling a designated number, or the message service clerk, the guest receives his message.

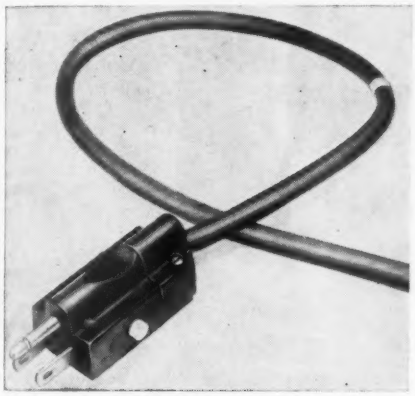
The message waiting service does not affect normal telephone service. The guest may answer incoming calls

or place outside calls. To stop the flashing light, however, he must call the attendant, who restores the turn-key to the non-operated position.

Control unit equipment, contained in a modern trimline metal wrap-around cabinet, is 16" high, 11½" deep, and 21½" in length. The unit is available in grey, with designation strips for room numbers. Message Service Telephones, in black and 10 colors, are also available. *Check NP* 496.

Motor Protector

A MINIATURE circuit breaker designed specifically to protect small motors in portable power tools and appliances, has been announced by Modern Manufacturing Co., Inc. Unit



attaches to end of cord and protects motor from burning out due to overload or overwork.

These motor protectors will automatically cut off power when machine is overloaded or overworked, and a reset button, instead of fuses, is used to reset the circuit breaker. They are available from 3 to 10 amps. *Check NP* 497.

Winter Liners

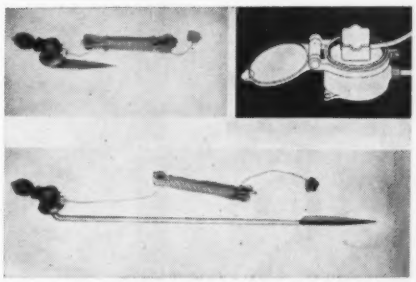
NEW winter liners designed for use in all safety hats and caps are now being manufactured by The Fibre-Metal Products Company. The full line includes, in addition to models of standard construction, Neoprene-coated liners without metal parts for use with electrical hats and caps, knitted liners for universal use and disposable liners for perspiration absorption and for use as a "visitor's" sanitary liner.

The winter liners are made of water-repellent, mercerized and sanforized fabrics, tailored for maximum comfort and service life. They feature heavy gray outer flannels and red knit linings. Chin straps with adjustable snaps enable snug fit in all sizes

available. For extremely frigid climates liner models are made with an extra urethane insert lining. A snap-on mouthpiece gives additional face protection against cold winter winds. *Check NP* 498.

Portable Stake Jacks

NOW AVAILABLE for backyard, patio, or other portable use are the new 9" and 39" stake mounted outdoor jacks, manufactured by Suttle Equipment Corporation. Also valuable for temporary telephone service



at county fairs or other public gatherings, the S. E. 16151 outdoor weatherproof jack is fitted to a 9" earth stake, or 39" post stake, in desired locations to provide portable telephone service. *Check NP* 499.

Talk-A-Phone

TALK-A-PHONE Chief Redi-Power, a new all-transistorized model designed to overcome high noise levels and provide complete inter-communication, has been introduced by Talk-A-Phone Co.

The unit is less than three inches high and lies flat on a desk. It is self-compensating to deliver up to 20 watts of power to all or any group of stations, supplying ample volume to each station when called simultaneously, as well as individually. Each station receives its pre-determined amount of volume with no division of output as more stations are called at once. Return speech from called stations is received at normal room volume.

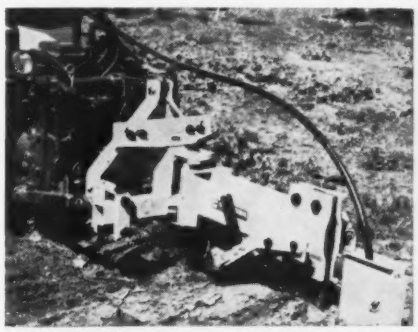
Standard features of the unit include private or non-private operation of masters and staffs at the user's choice; an incoming call chime; an

external relay control for use in high noise level areas; busy signals which visually indicate when a given station is in use; and monitoring signal. Voice range power reproduces speech with clarity and naturalness of tone. *Check NP* 500.

Cable Layer

INTERNATIONAL Harvester Co. has announced availability of a new International No. 2 Cable Layer for use by utilities, telephone companies, contractors and others desiring to bury cable, tubing or pipe.

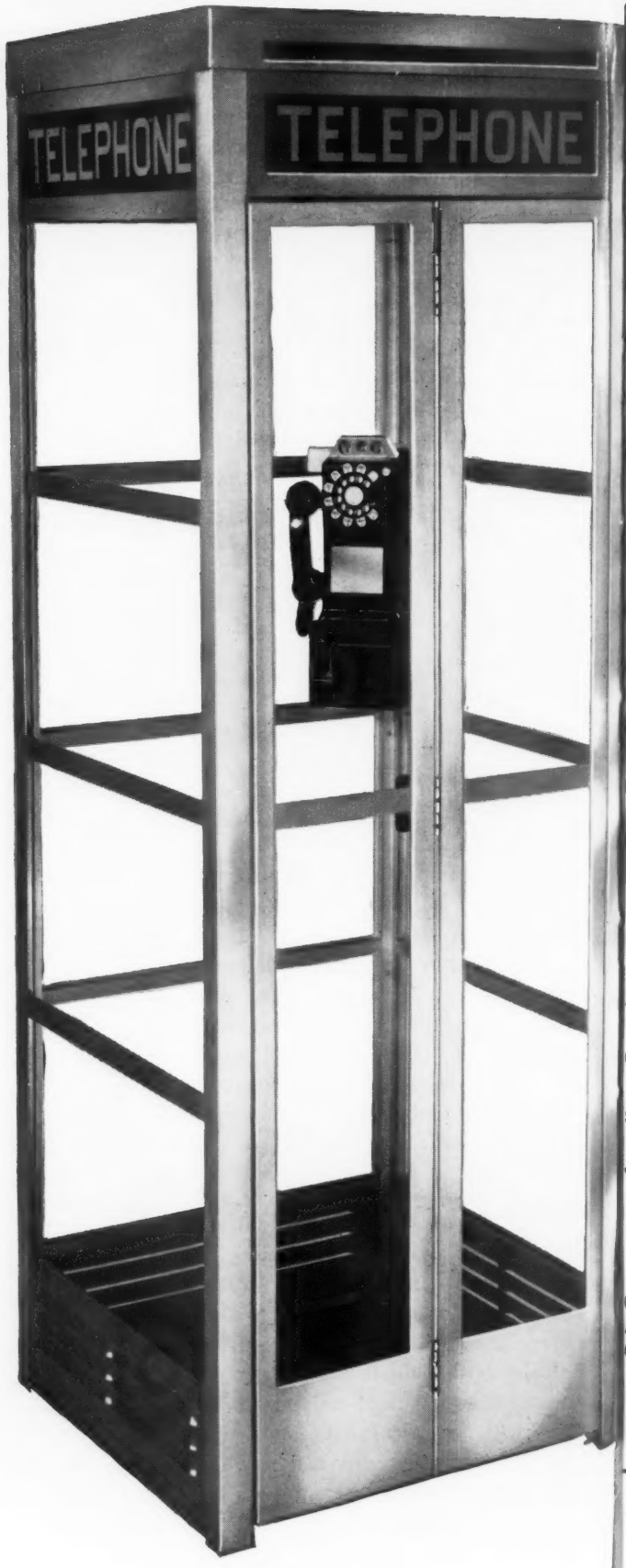
The cable layer is available with a variety of hitch options to fit wheel or crawler tractors in common use in this application, including the company's two-point Fast Hitch, or three-point hitches in categories 1, 1½ and



2. The subsoil standard is 1x8-inch heat treated steel, and the cable layer features a subsoiler. Its pivoting rear frame enables the operator to make tight turns.

Featuring a detachable inner shoe

NEW "COMPACT" ALCOA ALUMINUM BOOTH TAKES 26% LESS FLOOR SPACE!



Fits where no booth ever fitted before . . . stacks closer in high-revenue locations!

This new Alcoa® Aluminum "Compact" indoor booth adds revenue by providing convenient service with complete privacy in places no booth ever fitted before. Just 28¾ in. square, it takes 26 per cent less area than its bigger brother . . . saves valuable floor space in supermarkets, drugstores, office buildings, department stores and other busy locations.

Its flush roof lets the Alcoa "Compact" booth stack closer in tandem where traffic dictates to earn more revenue per square foot of floor space than any booth made before. Designed to harmonize with modern decor, the Alcoa "Compact" booth attracts passers-by with its clean appearance and slim lines. Ceiling vent fan and louvered bottom panel are optional.

Maintenance: minimum! Solidly built of heat-treated Alcoa Aluminum Extrusions, the Alcoa "Compact" booth resists damage and vandalism. Alumilite* finish stays bright and shiny with just an occasional washing down.

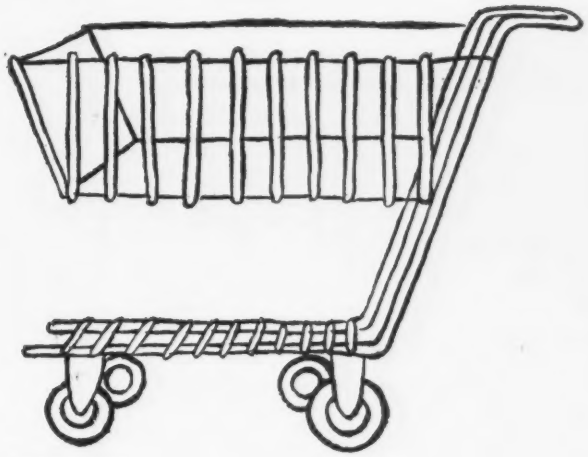
*Trade Name of Aluminum Company of America

Contact your telephone supply jobber for more information on the new Alcoa "Compact" indoor booth, or write for free folder: Aluminum Company of America, 1721-J Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

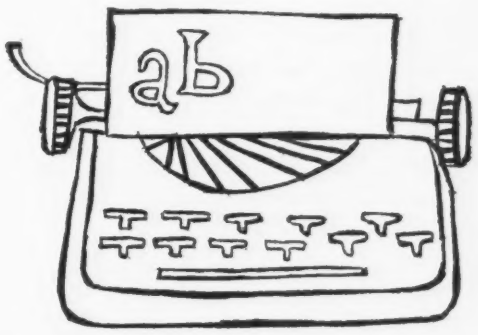
ALUMINUM COMPANY OF AMERICA

Alcoa "Compact" telephone booth goes where revenue is high:

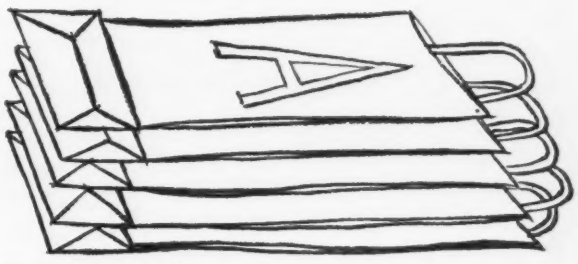


Supermarkets

Drugstores



Office Buildings



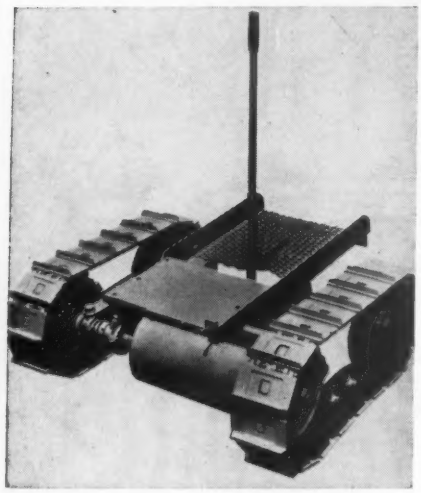
Department Stores

which enables operator to remove cable or tubing without necessity of cutting it, a roller equipped cable guide permits all types of cable, plastic tubing or copper water pipe to be laid free of damage. *Check NP* 501.

Crawler Mounted Trencher

THE CHARLES Machine Works, Inc. has announced a new Crawler mounted Ditch Witch trencher series. The crawler mounted machines are available in all M series machines in either 9 or 12 horsepower models.

The trenchers are suited to applications where traction or flotation is

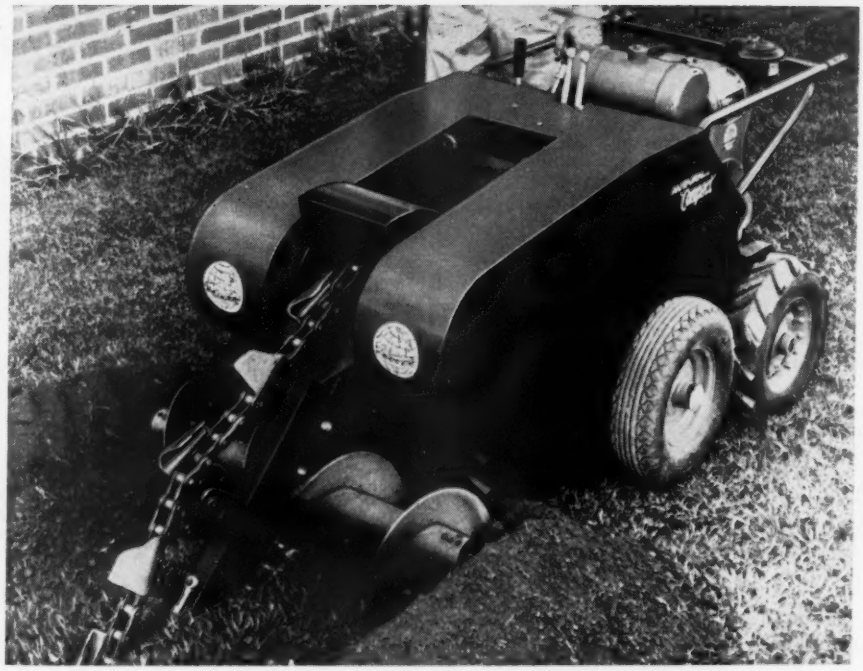


marginal, or where a considerable amount of maneuverability is required. Unit is self-propelled and equipped with a steering device.

Ditch Witch is also producing a crawler adapter kit which can be mounted on any M-3 series machine produced in 1959 or 1960. It can be attached with five bolts to the frame of the machine, after the removal of the axle and axle bearings. *Check NP* 502.

Self-Propelled Trencher

A NEW self-propelled trencher from Auburn Machine Wks., Inc., has single unit body constructed of heavy steel plate, rigidly reinforced and electrically welded, and becomes a precision made mounting fixture to support all other parts in perfect alignment. The four-wheel drive in both forward and reverse is powered by a hydraulic drive that automatically gives maximum trenching speeds



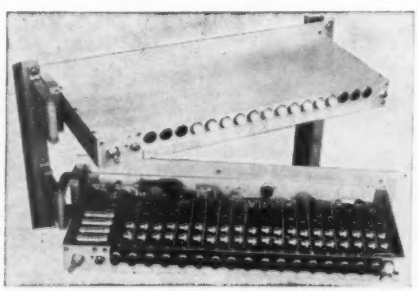
Auburn Machine Works Self-Propelled Trencher.

under varying soil conditions. The digging boom is lifted hydraulically through an arc of 186 degrees.

The trencher is powered by a 9 H.P. Wisconsin engine having Stellite valves. Auburn's patented non-clogging digging bits mounted on a digging chain of 24,000-pound tensile strength and its two-way dirt disposal affords trouble-free operation. Trenches may be cut 3", 4½", and 6" wide and down to 5' deep at actual job-proven speeds of up to 500' per hour. *Check NP* 503.

Fault Alarm

COLLINS RADIO Company has developed a completely transistorized fault alarm for its microwave systems which is capable of reporting 11 or



17 different fault conditions from each of as many as 30 remote stations.

Tones can be set within one of five ranges between 1 and 30 kc. The number of stations reporting over a single communication channel may be increased at any time by simply adding transmitter and receiver pairs and tuning them to unused frequencies. Because tone spacing is at intervals similar to that in FSK telegraphy, upwards of 30 separate remote stations can report over a single baseband without interfering with other communications. *Check NP* 504.

New Idea In Business-Gifting

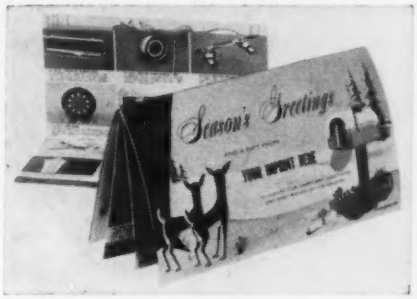
A SENSIBLE solution for obligatory gift-giving for Christmas — a growing problem for executives in this industry, especially in light of recent Internal Revenue Department crack-downs — has been announced by Gallery of Gifts, Inc.

This innovation, called the Gift-Bookard, was developed as a unique and memorable way of saying "Thank You" to customers and employes. Monarch size, the Gift-Bookard is a combination of personalized Greeting Card on the cover, a registered Gift Certificate in the form of a postage paid reply card on the back, and a colorful booklet offering recipients a choice of 24 impressive gifts.

A special feature of the Gift-Bookard is the useful and worthwhile nature of the gifts, each of which is valued to $10, is unconditionally guaranteed, and performance is war-

ranted and bonded by insurance. Claimed to be the widest selection available, the 24 gifts are shown in full color, and almost anyone would enjoy personally choosing and using any of these practical gifts.

An interesting aspect of the Gift-Bookard idea is that the Gallery of Gifts does most of the work. The donor orders the exact quantity of Gift-Bookards he needs — whether 50 or 50,000 — with his personal or company name imprinted on the



Greeting Card cover. When the donor mails the Gift-Bookards to his list, each recipient selects one gift, noting his or her choice on the registered Gift Certificate card, and mails it directly to Gallery of Gifts. The gifts are then wrapped by Gallery of Gifts and shipped prepaid. That brings the donor's name to the favorable attention of the recipient for the second time. All of the printing, handling and postage are included in the $6.50 price the donor pays for each Gift-Bookard, which is good for one gift.

For further information, *Check NP* 505.

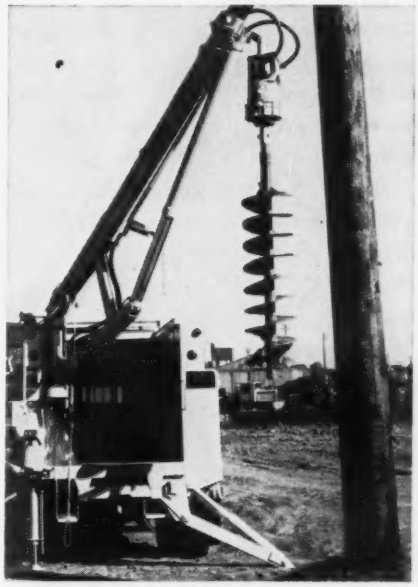
Corner-Mounted Derrick

A CORNER-MOUNTED power derrick has been announced by Holan Corporation.

The new derrick, known as the 7500, has a horizontal sweep of 110° to permit boring and pole-setting behind and to the curbside of the truck. Holes up to 30″ in diameter can be bored as deep as 8 feet without using an auger extension, and 12-foot holes can be bored with an auger extension.

The derrick is mounted on the left hand side of the body, but right hand side mounting is available. A semi-automatic locking device for the earth borer allows the borer to be moved by the extendible boom or locked for storage at the end of the main boom. When finished boring, the operator retracts the boom, and the borer automatically locks itself onto the main boom. When the extendible boom is needed again, it moves out free of the earth borer.

The derrick elevates to a maximum height just beyond 20 feet without the extendible boom, 27′ 6″ with boom extended and will handle 70-foot

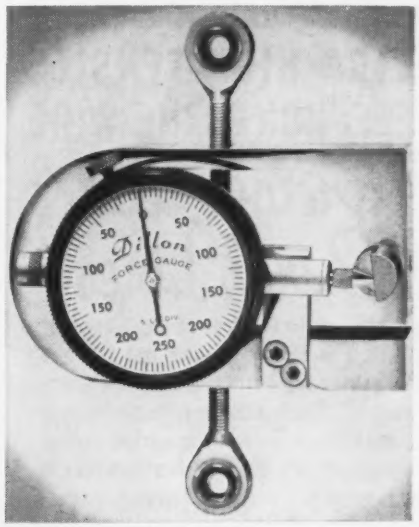


poles. Design of the boom end permits installation of an extra 2-foot section for added height. It will "live boom" up to 8500 pounds, and lift up to 10,000 pounds with the winch line. All controls are safely located to the left rear of body. Oil carrier tubes for the earth borer move with the extendible boom, doing away with loose hose. *Check NP* 506.

Push-Pull Gauge

W. C. DILLON & Co. has announced a new push-pull gauge with a split dial that gives readings of compression loads and tensile loads. Also, it can be hooked into a system to measure and control oscillating loads in compression and tensile.

Dillon's push-pull (compression-tensile) gauges are individually cali-



brated in capacities of 5-0-5, 12.5-0-12.5, 25-0-25, 50-0-50, 125-0-125, 500-0-500, 1250-0-1250, 2500-0-2500, 5000-0-5000, 12,500-0-12,500, and 25,000-0-25,000 lbs. Accuracy guaranteed to within 1% ± of full scale reading. A complete line of other Dillon Force Gauges also available for specific use as compression or tensile measuring instruments.

All units, either Split Dial Push-Pull types or specific compression or tensile instruments, can be supplied with micro switches as optional features. *Check NP* 507.

To Help Us Process Your Request As Fast As Possible, Please Fill Out All Items In The Coupon.

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Crapo
HTL-195
EXTRA HIGH-TENSILE
TELEPHONE LINE WIRE
for low-cost
Rural Lines

• Spans up to 600 feet in Heavy Loading, 650 feet in Medium Loading and 700 feet in Light Loading districts are possible where Crapo HTL-195 is employed. This extra long span construction results in marked savings in costs per mile of line. Pole structures can be reduced to a minimum. Fewer pole structures mean substantial savings both in materials and man-hours of labor. There is less hauling to be done, fewer holes to dig, less material to be handled, installed and connected.

Improved electrical qualities make practical typical subscriber loops of 14 to 15 miles with normal voltages and equipment. Also can be used for subscriber carrier.

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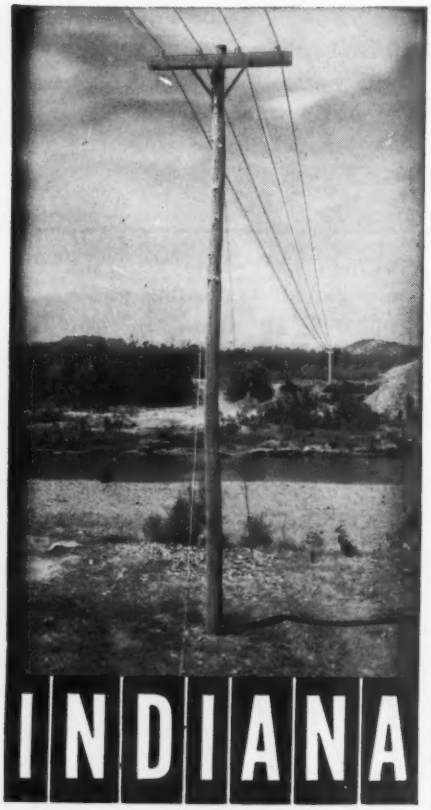


INDIANA
STEEL & WIRE CO., INC.
MUNCIE, INDIANA

"The Industry's Competitive Challenge"

(Continued from page 32)

financial market also requires a management "alert" to avoid "marriage" arrangements under contracts foreclosing other future sources of money or better deals when times change. There have been more than one case of "drying up" the well in an otherwise attractive deal. Stringent mortgage terms, poor refunding privileges and supply commitments can, and sometimes do, create obligations and ties which over a long period have to be undone and remodeled or produce a retreat from the best in financial development. To be competitive for finances, bargaining strength and selectivity should be protected each step of the way.

Superior and alert management also keeps the financial shop in order by minimizing the burdens of idle capital. This involves coordinated planning of physical and financial projects. It also usually contemplates the incremental use of short term borrowings, as needed, or using lines of credit with minimum commitment fees and progressive draw-down features which do not saddle the operations with *present* obligations to maintain non-productive money resources because of *future* needs.

The severity of financial competition and the success in meeting its impact on any company can be measured by loan contract terms, rates of interest paid and a variety of particulars, including regulatory response — adding up to a good or to a bad credit situation or to something in between.

Regulatory commissions and your bankers have to be *sold*. Such selling is best expressed in aggressive thinking along not one but *all* of the lines mentioned and with a keen competitive knowledge that "the butcher, the baker and the candlestick maker" are also in the field with their earnings and their demands for capital in direct comparative competition.

Talent Competition

FOR AS long as most of us can recall, the telephone industry has been fighting somewhat of a defensive battle in the talent recruiting field. Reasons for this are not all bad but it is a fact of the industry which needs full recognition to be effectively handled.

Among other factors in this situation which I believe deserves self-examination and perhaps correction is a certain traditional "long-haired" pride in professionalism and not enough of the mercenary in our approach to recruiting and holding on to talent. Being in a public and regulatory "show window" is a contributing circumstance to timidity.

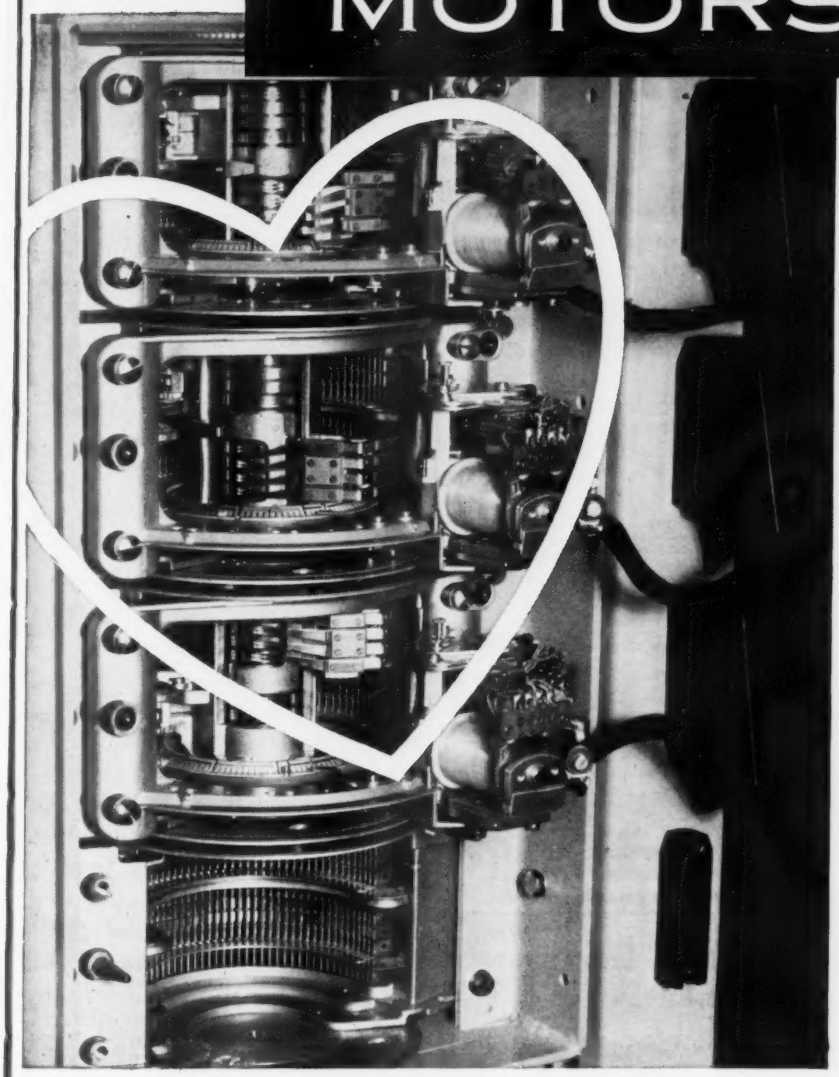
To a lesser degree, but perhaps too much, we resemble educators and the clergy in an idealistic egotism that makes money a secondary inducement in building organizations. On the average, even other public utilities are more liberal in the top, incentive brackets of compensation.

Perhaps it is time, or overdue, that we be less amiable to the cold and unfavorable salary comparisons with the faster talking but better paid areas of industry — and *up* our sights. Even some of the most eligible and most dedicated of young professionals are tempted, and yield, to higher personal income businesses. Except for the entertainment and perhaps "artistic" fields, executive level compensation should match the best — not the extravagant but the *best* — salary levels in our communities. This also embraces working conditions, bonuses, options, and the "waterfront" of career incentives and motivations.

It is good, and a worthy basis for pride, that our industry is imbued with professional idealism. Nevertheless, the fact of getting only what one pays for — and no more — applies over the long stretch. The fact that the industry has been built on sound thinking and management, which can accept first rank rating, does not assure the future in this respect unless we work at it.

It is only in searching out personnel quality that cumulative waste and its consequences can be avoided. Putting it another way, talent is the greatest and most vital of economic

MOTORSWITCH



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The Motorswitch has been proven in over a million lines of central office systems now in world-wide service . . . overwhelming evidence of its universal acceptance. Use of the USI Motorswitch enables central office systems to combine the speed and flexibility of common control systems with the simplicity of step-by-step systems.

HIGH STEPPING SPEED—Searches over a maximum of 160 contacts per second, compared to 30 to 40 on stepping switches.

NEGLIGIBLE VIBRATION—Is an advantageous result of the Motorswitch being electrically driven and electrically stopped. Microphonics are reduced and noise levels in equipment rooms are lowered by the absence of ratchet-driven parts.

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SOLDERLESS BANK CONTACT STRIPS—Reduce the required number of soldered connections by 90% . . . increase reliability . . . simplify regrading . . . cut the need for grading and level hunting switches.

VERTICAL BANK CONTACTS—Shrug off wear-producing dust.

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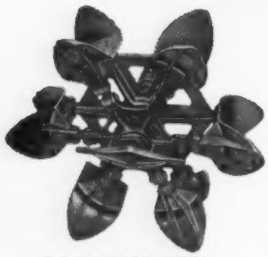
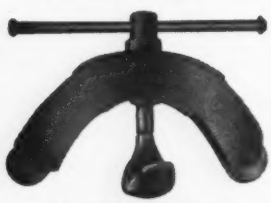
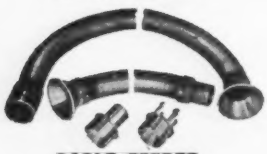


C-R POWER REEL



SLACK PULLER



CABLE FEEDER

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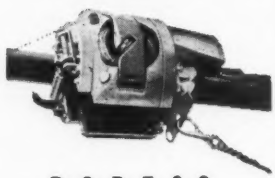

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Special Purpose Tools To Specifications — Catalog on Request

Over 600 various items of Line Construction Tools, Maintenance & Pressure-Testing Equipment in stock for immediate shipment

assets, producing operating efficiency, public acceptance and faith and persuasion in the regulatory and financing fields. It creates the *personality image* for a company, that factor which holds a company together and perpetuates its identity.

The Latin world's name for a corporation, "anonymous society," is descriptive and illustrates a point here. The physical and legal creature that is a company has only such life and is no more than its top people and their abilities. These cure the anonymity and the dullness of an otherwise uninteresting economic machine.

This all adds up to the fact that thought and time devoted to studying employe aptitudes and their educational experience roots, and comparing them with the best business talent in the community, is time and thought well spent.

To find a favorable comparison or produce one, income has to be generated to dignify salaries and career conditions which match the best. This is an unending challenge. Competition for talent is getting tougher and hotter as new and similar employment opportunities are multiplying in an age of science and automation.

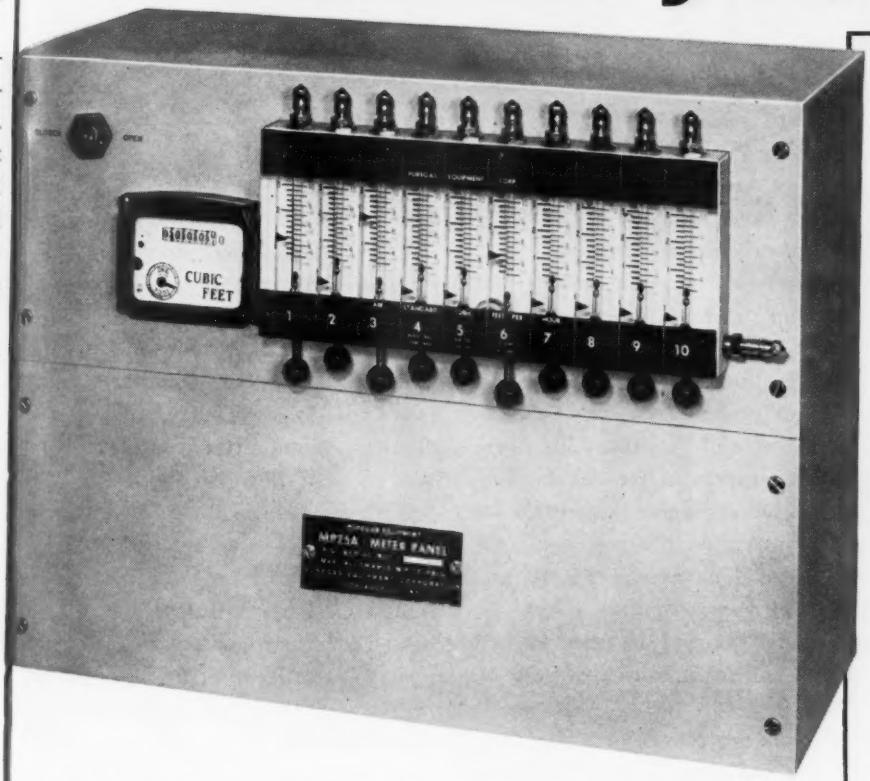
Marketing Competition

IN RECENT years there has been a growing awareness in telephone management that we are actually competing with other customer interests and customer thought processes for the customer dollar. In the standard and usual service fields we have been saying much and doing much in "selling." This squeezing into consumer budgets by selling extensions, more lines and supplemental equipment is important and probably a good "warm up" for other required competitive efforts which may have been underrated to date by many Independent companies.

Business institutions and governmental organizations have reached a size in the United States, even on the small city level, where they want and insist upon the best and latest communications. Are any of your local business neighbors doing things for themselves, or under contract with others, that the telephone company

TO LENGTHEN CABLE LIFE AND CUT MAINTENANCE COSTS—

Pressurize your cables



Metering Panel of the PUREGAS Continuous Feed Pressure System. The panel monitors and distributes the flow of pressurized air from the PUREGAS Air Dryer to toll, trunk and exchange cables . . . measures the flow delivered to groups of cables or to individual cables . . . provides convenient central instrumentation.

Air Dryer of the PUREGAS system. This compact unit compresses room air and delivers it under pressure to a storage tank, where it is cooled to near freezing. Compression, storage cooling, then expansion to the lower pressures within the cable reduce relative humidity from 100% at high temperatures to less than 2% at 70°F. Air Dryers and Metering Panels, products of Puregas Equipment Corporation, are available via Graybar.

Toll, trunk and exchange cables all have longer service life and cost much less to maintain when they are:

1. pressurized with dry air supplied through PUREGAS equipment;
2. supplemented with GENERAL MACHINE PRODUCTS accessories.

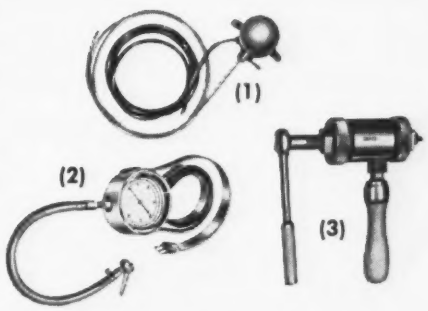
PUREGAS equipment at a central location feeds a continuous supply of dry air under pressure into the cables . . . to keep moisture from reaching the conductors. As air is lost through the minute breaks that usually occur in older cable sheaths it is replaced automatically by dry air from the PUREGAS Air Dryer and Compressor.

Serious breaks along the line, however, cause excessive leakage of air, and are indicated on the PUREGAS Metering Panel.

Using GMP accessories, repairmen then pinpoint location of the breaks—by noting differences in air *pressure* at selected points—and make repairs, usually during normal working hours.

Pressurize to minimize outages . . . to lengthen cable life . . . to cut maintenance costs. PUREGAS and GMP equipment is distributed nationally by GRAYBAR.

Get complete information. For these descriptive folders, phone your nearby Graybar Representative. Or write to Graybar in New York.



GMP Pressure Testing Contactors (1) located at strategic points, monitor pressure throughout the system and aid in detecting leaks. *Pressure Testing Gauges* (2) give precise measurements of pressure. *Pressure Guns* (3) inject compound into cable to make pressure plugs. These, as well as Pressure Testing Ells, Drills, Depressors, Sealing Compound and other tools for pressurized systems, are made by General Machine Products Company and are available via Graybar.

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It pays to keep Cablegard* on hand . . . for there's no faster, lower-cost way to physically protect cable anywhere, above or underground.

Cablegard is a split-pipe sheath that *clamps around* cable. You get the protection of solid-wall pipe, yet you install in minutes—with no special skills needed. And with Cablegard, you can eliminate most cutting and splicing!

You'll be miles and dollars ahead—on every job—with Cablegard. Contact your equipment supply house or write direct to Butler Manufacturing Company for details.

Exclusive clamping tool quickly clamps halves together.

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should be doing? How about the industrial, and perhaps even residential, intercommunication systems and signalling systems? Are you serving all of the mobile and private needs of your police departments and fire departments? How about the taxis and delivery accommodations?

Your connecting companies are fighting a competitive battle in the leased line, TWX and data transmission fields. Are you an interested part of this?

Telephone management in these times must also have the competitive "guard up" in handling government projects. The sheer magnitude of communications for missile bases and modern defense projects, and perhaps space projects of the future, can carry a discouragement for the shy and conservative manager. But in this let me reassure even the smallest company. Here is an area where the resources of your suppliers should be mobilized and aid of the best industry contract and legal counsel should be enlisted.

Go after the government business. It is big business. It is a field that private enterprise should handle. The bureaucratic threat of government agencies to do these things themselves should be beaten down. It is a competitive opportunity where the sound thinker, forceful management, and ingenious planner will muster his financial, legal and supplier resources to seize sound new business opportunities that are rightfully possessions of the telephone industry.

In marketing we must not discount the new or the different. There will be much more of that in these fast-moving times. Frontiers of new and permanent business may present an obscure and hazy aspect at first sight. It is true that these may present ominous cost and physical problems at the outset. But you have strong professionals behind you in your supplier organizations and your trade association affiliates.

A sharp competitive eye to the future dictates *being there* — "*first* with the *most*" — and with the *best* in reliable service.

Conclusion

MUCH of this discussion may seem to have touched upon the obvious — *when we stop to think about it.* This latter is really the whole point — how often *do* we stop to think about it? More important perhaps — are we not letting regulation and our communities overlook these facts — what do we *do* about it?

Is there a branch bank in your communities — a Safeway Store, Woolworth, Sears, J. C. Penney? — perhaps a General Motors plant or a branch of Metropolitan Life Insurance? — a railroad or trucking headquarters? If there are, these are your competitors as well as your customers. They are "as well heeled" as the telephone company — or probably much more so. They can hit the financial market — employment market — perhaps even the communications service market on a competitive "do it for themselves" basis with strength which sets standards that successful telephone management is compelled to meet.

Every public service commissioner and commission staff executive should be made keenly aware of this. The public should be reminded. This is the life blood of adequate rates — of efficient operations — of sound finances — of vigorous survival on an independent basis. — *J. T. Naylor.*

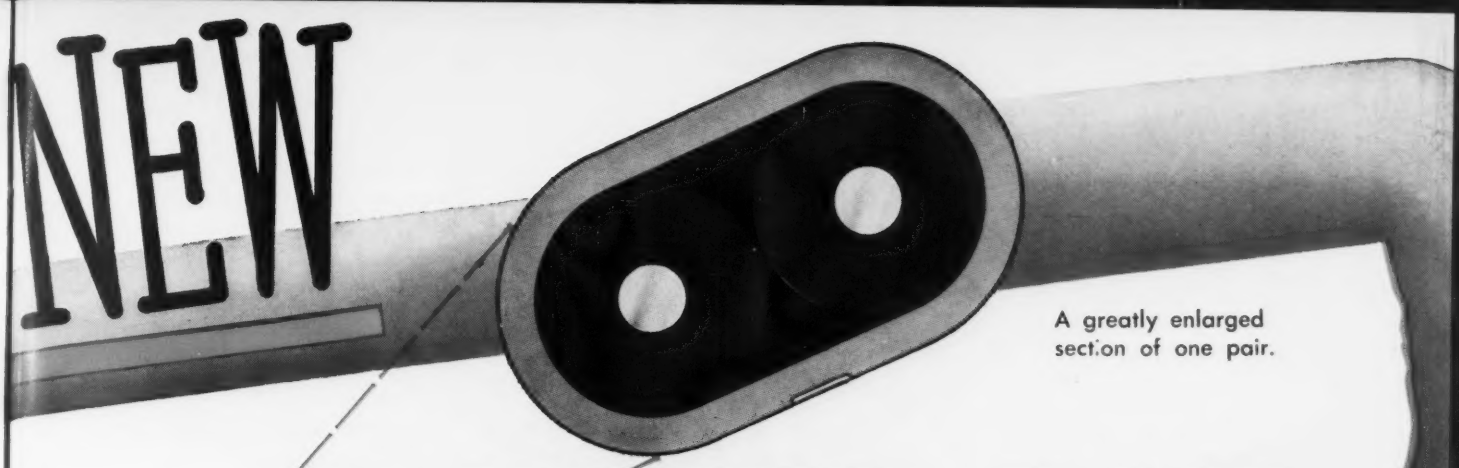
Color Selection Chart

ISSUED recently by Suttle Equipment Corporation is a new Color Selection Chart which shows many DuPont baked enamel finishes available on all steel Suttle telephone booths, both short and full length models.

Copies are available, along with full booth literature, by writing *Suttle Equipment Corporation, Dept. TE&M, Lawrenceville, Illinois.*

Soldering Tools

NEW CATALOG on Vulcan Soldering Tools is available on request to *Vulcan Electric Co., 88 Holten St., Dept. TEM, Danvers, Mass. Ask for Catalog VG-250.*



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Will serve you longer . . .will provide the true economy that high quality always gives.

NEW

- ★ **TOUGHNESS** — Withstands unusual physical abuse.
- ★ **ELECTRICAL STABILITY** — Minimizes attenuation changes from dry to wet weather.
- ★ **EASY PAIR IDENTIFICATION** — Single, two-color jacket codes individual pairs.
- ★ **EASY ACCESS TO PAIRS** — In all pair sizes each pair appears on the outside at frequent intervals.
- ★ **EXTREMELY LOW RESISTANCE UNBALANCE**

High density polyethylene insulation . . . Extra-heavy wall thicknesses . . . Fully color-coded common jacket over each pair.

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Certificates Presented Graduates of USITA'S Management Development Program

PARTICIPANTS in the United States Independent Telephone Association's 1960 Management Development Program were honored August 5 when they were awarded certificates at graduation ceremonies conducted by the School of Business at The University of Kansas, Lawrence.

William C. Henry, president and general manager of Northern Ohio Telephone Co., Bellevue, Ohio, and a director of USITA, delivered the commencement address in which he discussed the responsibilities of management in the light of tomorrow's opportunities and challenges.

"Good management," Henry emphasized, "is the process of making decisions that keep the best interests of customers, employes, the community, and the owners in their proper balance."

Speaking of the telephone industry, Henry commented: "Our communications system is regarded as an outstanding business achievement, representing the best of free enterprise in America. It represents the work of many telephone people during nearly a century of industrial growth in this country. Today we find ourselves operating in a new kind of business climate."

As to the future challenges within the industry, he said: "The Number 1 endeavor of the industry is providing our customers with a high quality of communications service."

In congratulating the participants for their achievement in completing the Program, Henry said: "The thirst for more knowledge is one of the motivating reasons for your presence here and why you have applied yourself so industriously during these

Participants in USITA's 1960 Management Development Program at the University of Kansas July 11-August 5 were: Bottom row (l. to r.) — ROGER L. SINGLETON, University of Kansas, Lawrence; PAUL E. NELSON, General Tel. Co. of Ill., Bloomington; ALBERTO LEIVA, Compania de Telefonos de Chile, Santiago; LAURENCE R. BOTTOMLEY, General Tel. Co. of Ill., Bloomington; ROBERT W. ADAMS, General Tel. Co. of Wis., Black River Falls; CARL PRELLWITZ, Central Tel. Co., Fairmont, Minn.; JAMES G. GANN, JR., Southern Bell Tel. & Tel. Co., Birmingham, Ala.; WILLIAM MANION, Pacific Tel. & Tel. Co., San Francisco, Calif.; JOHN CONNOR, Lewiston, Greene & Monmouth Tel. Co., Winthrop, Maine; JAMES R. SURFACE, Dean of the School of Business, University of Kansas, Lawrence; second row (l. to r.) — RONALD R. OLSEN, University of Kansas, Lawrence; WILLIAM F. FOWLER, General Tel. Co. of Pa., Erie; JOHN L. HINRICHSEN, Pioneer Tel. Co., Waconia, Minn.; PRESTON PLATT, General Tel. Co. of Ind., Inc., Valparaiso; DuWAYNE BAIRD, People's Tel. Corp., Butler, Pa.; CHARLES W. STATT, Rochester Tel. Corp., Rochester, N. Y.; DALE B. ECKROTE, California Water & Tel. Co., Monrovia; RICHARD KELLY, California Water & Tel. Co., Monrovia; ROBERT W. GLERUM, Rochester Tel. Corp., Rochester, N. Y.; KEVIN GRIFFIN, General Tel. Co. of Ia., Grinnell; JACK D. BREWER, Public Utilities Co., Crossett, Ark.; JOHN R. YEAGER, Harvard Business School, Cambridge, Mass.; third row (l. to r.) — ALLEN GOODSPEED, West Coast Tel. Co., Beaverton, Ore.; CHARLES B. SAUNDERS, JR., University of Kansas, Lawrence; W. R. McGREW, Central Tel. Co., Hickory, N. C.; WILLIAM W. THOMASON, Northeastern Tel. Corp. & affiliates, London, Ky.; HERMAN M. WALLER, Northwestern Tel. Co., Freeport, Ill.; WALTER A. LEIGON, JR., General Tel. Co. of Southwest, San Angelo, Tex.; JUAN R. CASTANERA, Radio Corp. of Puerto Rico, San Juan; JAMES ORNELLAS, Hawaiian Tel. Co., Honolulu; RICHARD DIRCKS, Iowa-Illinois Tel. Co., New London, Ia.; ALTON F. BRADNER, Orange County Tel. Co., Middletown, N. Y.; JOSEPH P. TROTTER, United Tel. Co. of Mo., Kansas City; ISAAC W. GLEASON, International Tel. & Tel. Corp., New York City; RICHARD B. HOBSON, Lincoln Tel. & Tel. Co., Lincoln, Nebr.; FRANK RAYMOND WESTLAKE, Hawaiian Tel. Co., Honolulu; WILSON GARNETT, Virginia Tel. & Tel. Co., Charlottesville; JOHN WHITTAKER, West Coast Tel. Co., Everett, Wash.; FRANK PINET, University of Kansas, Lawrence; top row (l. to r.) — BENJAMIN M. WITNER, United Tel. Co. of Pa., Harrisburg; CECIL STOKES, United Tel. Co. of Ia., Newton; LEONARD HARRIS, Southwestern States Tel. Co., Brownwood, Tex.; WILLIAM SCHILLING, General Tel. Co. of Pa., Somerset; ROBERT D. BONNAR, Ashtabula Tel. Co., Ashtabula, Ohio; BRICE STARK, Southwestern States Tel. Co., Brownwood, Tex.; CECIL BRUCE BARKSDALE, Greenwood Tel. Co., Greenwood, S. C.; MITCHELL N. DREW, Quincy Tel. Co., Quincy, Fla.; ERNEST MENENDEZ, Southeastern Tel. Co., Tallahassee, Fla.; RICHARD LASHLEY, University of Kansas, Lawrence; DALLAS REID, Virginia Tel. & Tel. Co., Charlottesville, Va.

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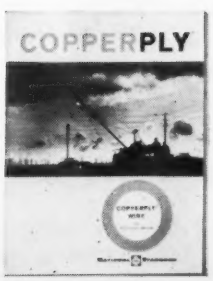
Only **COPPERPLY** by National Standard is available in *a variety of copper thicknesses* that can be tailored to specific industry needs. Whether your application calls for corrosion-resistance, ohm-resistance or strength above standard, tailor-coat **COPPERPLY** is the most economical wire you can use because *you pay only for the copper you need*. National-Standard Company, Niles, Michigan.



Write for Bulletin 203 that lists full size data, specifications and application photographs.

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NATIONAL-STANDARD

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; tire wire, stainless, music spring and plated wires • **WORCESTER WIRE WORKS** Worcester, Mass.; high and low carbon specialty wires • **WAGNER LITHO MACHINERY,** Secaucus, N. J.; metal decorating equipment • **ATHENIA STEEL,** Clifton, N. J.; flat, high-carbon spring steels • **REYNOLDS WIRE,** Dixon, Ill.; industrial wire cloth • **CROSS PERFORATED METALS,** Carbondale, Pa.; decorative, commercial, and industrial perforated metals.

CHARLES B. SAUNDERS (standing), associate professor of business administration, The University of Kansas, was in charge of discussions at this session of USITA's Management Development Program.

Faculty Member JOHN R. YEAGER (standing), associate professor of business administration, Harvard Business School, discusses functions of administration with participants in USITA's Management Development Program.

FRANK S. PINET (standing), associate professor of business administration, School of Business, The University of Kansas, addresses participants in USITA's Management Development Program.

past four weeks. Self-improvement is a never-ending necessity if we are to acquire incentive and inspiration to do a better job."

Following the presentation of Certificates of Completion by Chancellor W. Wescoe, of The University of Kansas, a reception was held for the graduates and their guests, among whom were families of a number of the participants, members and directors of the United States Independent Telephone Association, and members of several state telephone associations. Included were Kenneth L. Dally of Lincoln, Neb.; J. K. Galloway of Winter Park, Fla.; Adam J. Schwartz of Rochester, N. Y.; and Robert J. Fegan, of Junction City, Kans., members of the Personnel Committee of the association, of which Fegan is chairman.

The objectives of the intensive four-week program were to help the participating executives do more effective jobs in their current positions and to help them prepare for more challenging responsibilities.

Instruction was within the areas of the functions of administration, the American business climate, and rate regulation. Functions of administration were subdivided into control and financial administration, human relations in business, marketing and administrative policy and planning. The American business climate focused on economic, political, and social aspects of the development of the whole community, local as well as regional and national.

The faculty consisted of experts in their fields from Harvard University, the University of Virginia, and the University of Kansas. Dr. James R. Surface, formerly of the Harvard Business School faculty, now dean of the University of Kansas School of Business, was director of the program.

J. Lewis Powell Will Address USITA Convention

THOSE men and women of the Independent telephone industry who have attended previous annual conventions of the United States Independent Telephone Association in Chicago in mid-October at the Conrad Hilton Hotel know that, among other things, they can expect to hear

KEYSTONE Telephone Wire . . .

when and where you need it!

From many convenient locations, quality Keystone Wire is available for the needs of the telephone industry. Keystone offers a full range of Class A line wire in 50M, 85M and 135M tensile strengths. All line wires meet the specifications of A.S.T.M. and A.T.&T. and are approved by R.E.A. Your Keystone Distributor also offers a full line of galvanized bond, tie and construction wire in a full range of gauges. For quality wire—and prompt delivery—contact your nearest Keystone Telephone Wire Distributor or write direct for information.

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Crescent Electric Supply Company
Burlington, Iowa
Dubuque, Iowa
Cedar Rapids, Iowa
Davenport, Iowa
Madison, Wisconsin
Mason City, Iowa
Ottumwa, Iowa
Peoria, Illinois
Quincy, Illinois
Rapid City, South Dakota
Sioux City, Iowa
Sioux Falls, South Dakota
Spencer, Iowa
Sterling, Illinois
Waterloo, Iowa

Dakota Electric Supply Co.
Fargo, North Dakota

Joslyn Mfg. and Supply Co.
Birmingham, Alabama
Chicago, Illinois
Dallas, Texas
New Orleans, Louisiana
New York, New York
No. Kansas City, Missouri
Oklahoma City, Oklahoma
Omaha, Nebraska
St. Paul, Minnesota

Kingsport Electric Co., Inc.
Kingsport, Tennessee

Line Material Industries
Milwaukee 1, Wisconsin

Marshall-Wells Canadian Companies, Ltd.
Winnipeg, Manitoba, Canada

The Mine & Smelter Supply Co.
Salt Lake City, Utah

Nelson Electric Supply Co.
Dallas, Texas
Lubbock, Texas

Jack Pruzan Co.
Seattle, Washington

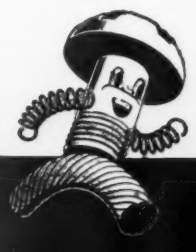
Southern Electrical Corp.
Chatanooga, Tennessee

Suttle Equipment Company
Chicago, Illinois
Lawrenceville, Illinois

Tele-Wire Supply Co., Inc.
Jamaica, New York

Tennessee Valley Electric Supply Co.
Nashville, Tennessee
Memphis, Tennessee
Little Rock, Arkansas

Wheeler Lumber Bridge & Supply Co.
Norfolk, Nebraska



KEYSTONE WIRE FOR THE TELEPHONE INDUSTRY

. . . by the makers of famous Red Brand Fence

"Off The Board"

Communications Securities

Markets as of August 11, 1960	DIVIDEND	BID	ASKED	LAST SALE
American Tel. & Tel. Co.	3.30			90
Anglo-Canadian Tel. Co. (Br. Col.-Dom. Rep.)	1.20	40	43	
Bell Tel. Co. of Canada	2.20			47½
British Columbia Tel. Co.	2.20	45¼	48¼	
Calif. Interstate Tel. (Calif., Nev.)	.70	13	14	
Calif. Pac. Util. (Calif., Nev., Ore.)	.90	20½	23	
California Water & Tel. Co.	1.36	29	30½	
Carolina Tel. & Tel. Co.	1.60	39	42	
Central Electric & Gas Co.	1.20	25½	27	
Central Tel. Co. (Minn., Ia., N. C.)	.88	21¼	22¾	
Chenango & Unadilla Tel. (N. Y.)	1.20	26	29	
Cincinnati & Suburban Tel. Co.	4.50	93	96	
Citizens Util. Co. (Calif., Pa.) "A"	stk. only	18	19½	
Citizens Util. Co. (Calif., Pa.) "B"	.48	17	18¼	
Commonwealth Tel. Co. (Pa.)	1.00	21½	23	
Florida Tel. Corp.	1.00	25	27	
General Tel. & Electronics Corp.	.76			28⅜
Hawaiian Tel. Co.	1.00	20¾	22¾	
Indiana Tel. Corp.	.50	24	27	
Inter-County Tel. & Tel. Co. (Fla.)	.72+stk	25	27	
Inter-Mountain Tel. Co. (Va., Tenn.)	.80	15¾	17	
Jamestown Tel. Corp. (N. Y.)	5.60	83	87	
LaCrosse Tel. Corp.	.80	15½	16¾	
Lincoln Tel. & Tel. Co. (Nebr.)	2.60	63½	—	
Lorain Tel. Co. (Ohio)	1.40	33	—	
Middle States Tel. Co. (Ill.)	.80	25	27	
Mountain States Tel. & Tel. Co. (Ariz., Colo., Mont., Tex.)	*			245⅛
New England Tel. & Tel. Co.	1.72			36¾
North Carolina Tel. Co.	none	15/16	1⅛	
Northern Ohio Tel. Co.	2.00	52	57	
Pacific Tel. & Tel. Co.	1.14			27¾
Peoples Tel. Corp. (Pa.)	4.00	78	83	
Pioneer Tel. Co. (Minn.)	1.00+stk	35	38	
Rochester Tel. Corp. (N. Y.)	1.00			23¼
Southeastern Tel. Co. (Fla.)	1.00	21	23	
Southern New England Tel. Co.	2.20	44⅛	46⅝	
Southern Nevada Tel. Co.	1.00	25¾	27¾	
Southwestern States Tel. Co. (La., Ark., Okla., Tex.)	1.20	23½	25	
Telephone Serv. Co. of Ohio "A"	*	27	29	
Telephone Serv. Co. of Ohio "B"	*	28	30	
Tidewater Tel. Co. (Va.)	1.40	25	28	
United Utilities, Inc.	1.40	42½	45	
Virginia Tel. & Tel. Co.	1.00	20½	—	
West Coast Tel. (Wash., Ore., Calif.)	1.28	26¾	28¾	
Western Union Telegraph Co.	1.40			43⅞
Western Utilities Corp.	.36	7¾	8½	
Western Lt. & Tel. Co. (Mo., Kans., Iowa)	2.00	43½	46½	

* Dividend rate on new stock after split not established

(Source of market — DEAN WITTER & CO.)

some of the most able and outstanding speakers in the nation.

This year's conclave, to be held October 9-10-11-12, will be no exception to the rule, according to the program-makers in USITA's Washington offices. Among those who already have accepted invitations to address the convention at one of the General Sessions is J. Lewis Powell of Washington, D. C. Powell, a mechanical and aeronautical engineer, is an internationally famous lecturer, humorist, and author whose topic will be "Cave Man to Space Man."

Powell has worked both in private industry and in Government. He is a recognized authority in the field of industrial logistics. In 1957 he received the Industrial "Oscar" of the Strategic Industries Association for outstanding services to Industry-Defense teamwork.

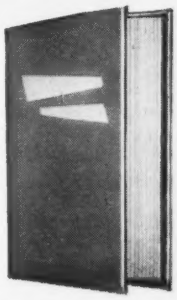
Powell is a dynamic and forceful speaker who uses shirt-sleeve English in his crusade for balanced progress. He is known nationally and internationally for his various talks on the "Collapse of Time" theme. These talks deal with various aspects of mankind's stumbling progress from muscles to missiles. Powell's talks, well spiked with warm humor and sound philosophy, have been the subject of numerous magazine articles, editorials, columns and other published comment. They have even inspired sermons and floor shows. His address is a must for all Americans who cherish their liberty and freedom. His message is powerful.

USITA's Executive Vice President Clyde S. Bailey, who lost no time in signing up Powell after hearing him speak recently in Washington, strongly recommends that every Independent telephone company be well represented during Powell's performance at the first of the general sessions on Monday afternoon, October 10. His address will be a different kind of talk, delivered in a different style. During the past few years at meetings from coast to coast people have been intrigued, stimulated, even provoked, but always entertained by this unusual discussion on the phenomenon of progress in our time.

Bailey advises that other speakers

HOW TO APPLY STATISTICS TO ENGINEERING DATA

—for more complete, accurate analysis



AIDED by this engineer's guide to practical statistics you can more fully analyze processing, research, and other kinds of industrial data. In plain terms it tells you how to apply statistical methods to engineering problems . . . how to correlate data . . . and how to treat experimental factors. Especially helpful, this easy-to-use book explains the technique of drawing the "best" line through data, and of accurately analyzing the variance. And—to round out your working knowledge of statistics—it gives you essential information on probability theory and frequency distributions. When you have a specific problem in statistical analysis, turn to the clear guidance, detailed examples, and more than 180 quick-reference tables in these pages.

APPLIED STATISTICS FOR ENGINEERS

By WILLIAM VOLK

Senior Research Engineer, Hydrocarbon Research, Inc.

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Fully explaining the fundamentals of

Semiconductor Physics

ELECTRONIC SEMICONDUCTORS

as related to rectifier and transistor problems

By EBERHARD SPENKE

Here is a rigorous and systematic introduction to semiconductor physics, developing the subject in a logical and consistent manner from simple concepts, and giving clear pictures of the conduction mechanism of electronic semiconductors within the framework of the *band model.*

The careful derivation of important relationships from precisely defined basic concepts and assumptions is one of the book's outstanding features. Others are the treatment of the acceleration of electrons; the treatment of the Zener effect; and the chapter devoted to statistics and kinetics of electrons as modified by electrostatic potentials. Germanium is the prototype substance used in all discussions of semiconductor behavior. All material on the conduction mechanism of semiconductors applies equally to thermionics, luminescence, and photoconductivity.

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Amertel 195 has other important advantages, too:

- Longer spans, fewer poles mean lowest installation costs.
- Lower resistivity assures improved voice transmission, even at relatively high frequencies.
- Streams, gullies, valleys can be strung easily and economically.

Our new "Amertel 195" booklet will give you the complete story. Write American Steel & Wire, Dept. 0275, 614 Superior Ave., N.W., Cleveland 13, Ohio.

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of exceptional ability will address both the general sessions and the usual technical conferences, and there will be no lack of the customary social and entertainment activities, including the Association's annual banquet, always a highlight of this great gathering of the men and women of Independent telephony.

Meanwhile, the various manufacturers of equipment and supplies are preparing their exhibits, which will completely occupy the fifth and sixth floors of the world's largest hotel, and which are always an outstanding attraction of the convention.

The names of other speakers and additional program details will be announced shortly.

GT&E Intl. Announces New Plant In So. Italy

GENERAL Telephone & Electronics International Inc., has announced that Automatic Electric S.A.T.A.P. of Milan, Italy, has started construction of a new telephone equipment manufacturing plant in southern Italy. Donald C. Power, chairman and chief executive officer of General Telephone & Electronics Corp., was guest of honor at the recent laying of the cornerstone ceremony in Marcianise, approximately 12 miles from Naples.

Following the ceremony, attended by Italian governmental officials, American diplomatic representatives, and over 600 residents of the area, Power was made an honorary citizen of Marcianise.

The S.A.T.A.P. headquarters plant in Milan produces telephone and communications equipment, as well as carrier and radio equipment. An associated company in Milan produces electronic components and equipment.

Other international manufacturing operations of GT&E subsidiaries and associates are located in Canada, Belgium, Great Britain, Argentina, Brazil, Mexico, and Japan.

Top Management Changes Made By L. M. Berry & Co.

L. M. BERRY & CO., Dayton, Ohio, has announced that John W. Berry has been named managing director, and J. William Craig, Jr. has been appointed general sales manager.

JOHN W. BERRY

Berry, who joined the telephone directory advertising firm in 1940, returned after the war in 1946, and became general sales manager in 1948, stated that the shift is the result of rapid company expansion in the past few years and anticipated future growth. As managing director, he will devote his time to over-all company operation to include such matters as management, personnel, and customer relations, with particular attention to sales.

J. WM. CRAIG, JR.

Craig joined the company in 1948 as staff assistant in the general office, and was later made sales administrative manager. In January, 1951, he was appointed Kentucky division manager, remaining in Louisville until November of that year when he was recalled to active duty by the Army. In September, 1952, he returned to the general office as general sales supervisor, the post he filled until his recent appointment.

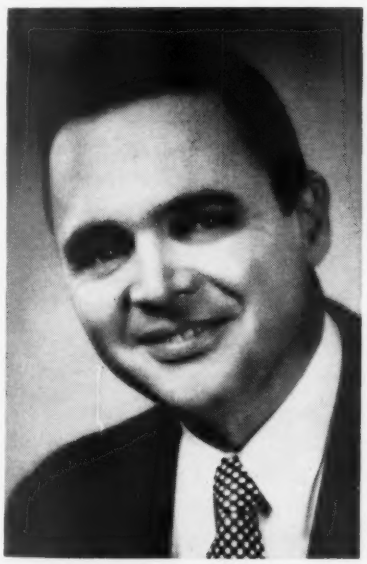
The changes of key management

personnel come about during the company's observance of its 50th year in the telephone directory advertising business. The firm was founded in Dayton in 1910 by Loren M. Berry, and today serves more than 270 Bell and Independent telephone companies throughout the United States.

United Names Crockett Staff Coordinator

THE APPOINTMENT of Raymond M. Crockett as staff coordinator has been announced by United Utilities, Inc. Crockett assumes his new duties in the executive offices at Kansas City, Mo., on the staff of Executive Vice President P. H. Henson.

In this assignment, Crockett will coordinate various telephone operations throughout the 15-state area in



RAYMOND M. CROCKETT

which the United System operates. Prior to this appointment, Crockett was vice president and general manager of the Northwest Telephone Co., Redmond, Ore. Northwest Telephone was recently acquired by United and concurrently merged with the Oregon-Washington Telephone Co., a wholly-owned subsidiary.

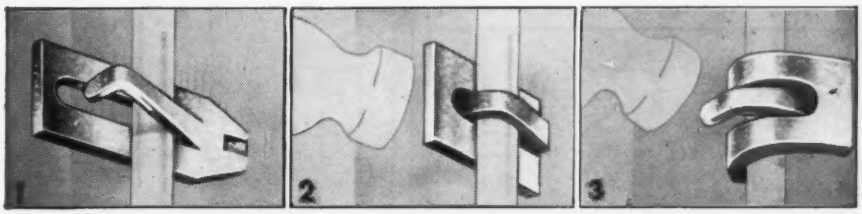
On completion of school in Akron, Ohio and the University of Akron, Crockett began his telephone career in 1944 with the plant department of the Ohio Bell Telephone Co. In 1948 he accepted a position with the Sunland-Tujunga Telephone Co., Sunland, Calif., where he engaged in

eliminates radio interference

KEARNEY NON-STATIC GROUND WIRE CLIP

When ordinary staples lose their hold in wood, contact pressure drops, and resultant air-gap static causes radio and television interference. KEARNEY Non-Static Ground Wire Clips prevent this interference by maintaining permanent, high pressure contact with ground wires, entirely independent of how tightly the clip is set in the pole.

When this clip is driven, a hook automatically, permanently grips the wire, remaining free of all trouble-causing air gaps. Inexpensive and easy to drive, this clip holds fast in all woods.



Easy to install: Just drive clip until point seats firmly in wood. Insert ground wire under hook, then drive until hook grips wire and starts protruding through slot in body. Bend end of clip over the wire and into the wood.

-358

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WE PRODUCE

The finest lashing wire possible because we believe . . . that lashing wire is one of the important parts of the cable plant, its duty being to hold the cable to the messenger for the life of the plant.

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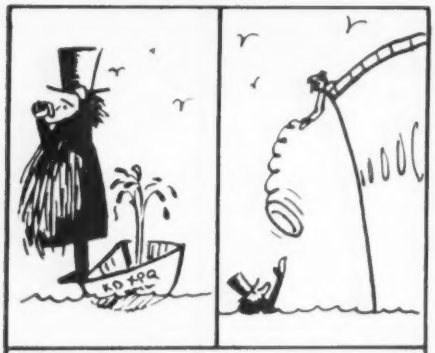
WE COIL

The best coil possible because we know . . . that tangled or out of shape coils can cause spinning trouble, waste and delay.

Write for Complete Information

CABLE SPINNING EQUIPMENT CO.

Topeka Kansas



A complete telephone directory publishing service

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9-1-60

plant department and general office work. Following this association he started as local manager for the Citizens Utilities Co. of California in 1952 and progressed to general manager of the commercial, traffic, and accounting departments. His affiliation with the Northwest Telephone Co. began in 1955 when he accepted the position of general manager.

Crockett has been active in community and industry affairs on the West Coast. He is presently a director of the Oregon Independent Telephone Association, and was chairman of the Plant Forum Committee and a member of the Toll Settlements and Private Line Committee of the Oregon association.

General Cable Transfers Vincent and Higgins

GENERAL CABLE CORP. has announced the transfers of P. L. Vincent to regional telephone manager at Rochester, N. Y., from branch manager, El Paso, Texas, and E. L. Higgins to regional telephone manager at Minneapolis from resident

P. L. VINCENT

salesman, Green Bay, Wis. Vincent will manage telephone product sales in the Northeast states; Higgins will serve in the same capacity in the Dakotas, Minnesota, Wisconsin and Iowa.

Vincent has been with General Cable for seven years, first in outside sales and then in sales managerial responsibilities at New Orleans

E. L. HIGGINS

and El Paso. He has managed the El Paso sales office for three years.

Higgins, also a seven-year man with General Cable, started with the corporation as an inside salesman in Milwaukee, the location of his alma mater, the University of Marquette. He was quickly promoted to outside sales and has been resident salesman at Green Bay for four years.

Earl C. Ewer Joins Stromberg-Carlson

EARL C. EWER has been appointed office manager for the West Coast Branch of Stromberg-Carlson's Telecommunication Division, it was announced by Edgar R. Sears, Sr., branch manager.

Ewer will have administrative responsibility for the internal operation of the West Coast Branch. He joins Stromberg-Carlson after a five-year period as president and manager of the Concordia (Mo.) Telephone Co., where, with REA assistance, he erected a new headquarters building while converting the company to dial operation. Earlier he owned the Buffalo (Mo.) Telephone Co.

Ewer has also traveled the Southeast and Midwest as a manufacturer's representative. Born in Winchester, Kansas, he started his telephone career in Kansas City with the Kellogg Switchboard & Supply Co. Later he served as an order clerk for the American Electric Co. After a period as Kansas City warehouse manager for the Automatic Electric Sales

THE MOST EXCITING WAY TO PRESENT A TELEPHONE IS IN A GLADWIN CARRYING CASE! HERE ARE BUT THREE OF THE MANY CARRYING CASES DESIGNED BY GLADWIN TO HELP BRING YOU ADDED REVENUE! RECOGNIZED AS THE TELEPHONE INDUSTRY'S FINEST POINT-OF-SALE DISPLAYS! INCREASE YOUR SALES IN EXTENSIONS, IN COLOR, AND IN OTHER TELEPHONE SERVICES WITH GLADWIN CARRYING CASES. WRITE FOR OUR CATALOG.

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ATLANTA 3, GEORGIA • JA 5-5384

In 1949, S & G was asked to develop a Portable Power and Pumping Unit for one of the large telephone companies; and, in 1950, after building a prototype unit which was approved by this company's engineers, was awarded a contract to build a large quantity of what is now known as the S & G Mobile Power Unit. These dependable and versatile portable plants are now in use by the hundreds, proving that QUALITY and ECONOMICAL OPERATION pay off handsomely in the maintenance field.

A few of the Mobile Power Unit's outstanding features are:

- Generator (slow speed for *quietness*) — 2500 Watt, 110 Volt DC
- Pump — 2800 GPH Diaphragm to remove seepage and drain back, can be operated from manhole by push button control
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- 300-Watt floodlight illuminates working area
- Operates soldering pot and iron, electric and air tools and safety lights
- electric blower to ventilate manhole
- supplies dry air for cable cutovers, flash testing, etc.
- buzzer signal for summoning helper
- entire unit is light, easy to handle

order through your favorite distributor

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SPECIAL EQUIPMENT FOR UTILITIES AND CONTRACTORS
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Corp., he traveled the states of Missouri, Arkansas and Kansas for that company. From 1948 to 1955 he was a sales representative in Virginia, North Carolina and South Carolina, calling on telephone, industrial and railroad accounts. He served in that position until taking over the Concordia (Mo.) Telephone Co.

B. T. Beazley Dies

B. T. BEAZLEY, 57, a member of the Mid-Eastern Division Staff of L. M. Berry & Co., died July 26 at the Rowan Memorial Hospital, Salisbury, N. C., following a heart attack.

Mr. Beazley, a native of West Virginia, had a varied career in representing newspapers in Welch and Bluefield, West Va. For several years, he worked for Reuben H. Donnelley

B. T. BEAZLEY

& Sons Co., selling Yellow Pages advertising in West Virginia, and later accepted a position with L. M. Berry & Co. in the Mid-Eastern Division, with headquarters at Bristol, Tenn.

At the time of his death, Mr. Beazley was completing eight years of service with L. M. Berry & Co. While with the company, he served as salesman, supervisor, special assistant to the division manager, and multi-book representative, handling accounts in both Bell and Independent towns in the states of West Virginia, Virginia, North and South Carolina, Georgia and east Tennessee.

Mr. Beazley is survived by his widow, one son, and one daughter.

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CABLE SPLICERS, Station Installers. Equipment Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 1800 Johnson Street, Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.

AMBITIOUS MEN — Qualified as station installers, equipment installers, cable splicers, linemen. Work in midwest, Harris-McBurney Co., Inc., P. O. Box 267, Jackson, Michigan.

HELP WANTED, Men Experienced in the Following Fields: Central Office Equipment Maintenance, Carrier Maintenance, Telephone Lineman, Telephone Serviceman, Cable Splicers. Steady work, good pay, good benefits, Company now serving Air Force Installations in Minot, North Dakota area. If you have experience in one, or more, of the above mentioned categories, and are interested in working for a fast growing organization, WRITE, giving experience and background to Paul A. Froemming, Manager, Souris River Telephone, 405 Third Avenue, S. E., Minot, North Dakota.

AN OUTSTANDING Area Engineer with the following experience is needed immediately — Outside Plant, Special Services, PBX-PABX, Budgeting, Minor C.O.E. and Cost Studies. This position is with a large expanding independent telephone company ideally located in Florida. Salary commensurate with experience and qualifications. Please send resume and photograph to Box 130, Telephone Engineer. All replies confidential.

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Including Flash, Meter and Filters

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Today only $74.95

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NEW—COOK XB. POLE TERMINALS, 16 PAIR — UNPROTECTED, WITH 5 FT. STUBS. $6.00 EA.

NEW—SPAN CLAMPS, MESSENGER WIRE TYPE. .10c EA.

REBUILT—W. E. DIALS. 25-H — or 26A — $2.50 EA.

USED—GOOD—233 CALCULAGRAPHS. $35.00 EA.

REBUILT — OR SOLD AS REMOVED FROM SERVICE, STROMBERG SUBSCRIBER SETS. 21250 WALL — DESK — 1243 — 1443 — 1543-A. WITH DIALS, ST LINE — or 320-30-40-50 CY.

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MAGNETO TELEPHONES — Leich 901 wall or desk magneto telephones. Cleaned, tested and guaranteed, $16.50 each. As removed from service $15.00 each. Turtle Lake Tel. Co., Turtle Lake, Wisc.

BURROUGHS MODEL F1000 Alphanumeric Accounting Machine. Control units are presently programmed for telephone utility billing using a multi-copy statement and subscriber ledger, and employe payroll accounting including quarterly payroll reports. This machine, purchased new in 1959, will be available March 1961. Sales price will allow for normal depreciation, conversion costs and discount in lieu of sales warranty. Samples of all forms available upon request. Please address all inquiries to Auditor, Western States Telephone Company, Box 305, Holbrook, Arizona.

THREE PEATROPHONES — Model K-59-23 made by Telephone Answering & Recording Corporation, New York. Best offer accepted F.O.B., Pine Grove, Pa. Lycoming Telephone Company, Pine Grove, Pa.

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Class 1900 Model Addressograph and 49 Drawer Cabinet with frames in A-1 condition.

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#6-B-29-1-5-DDD-20 Lock-out Relays (LO)

BATTERY CHARGERS

North Type 24008 48 Volt 8 Amp (220 Volt Input)
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TYPE 30 PABX

North Type 30 All Relay PABX in 6 ft. cabinet. Equipped for 3 Trunks 5 Links and 25 Lines, less Battery Charger and Batteries. (As removed from service — very good).

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WANTED — All makes, old telephones. Our truck will pick up and pay you cash on the spot. Telephone Co., Turtle Lake, Wisconsin.

CONSIDER purchasing any small Telephone company Box 129, c/o TEM, 7720 Sheridan Rd., Chicago, Illinois.

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BELTS — CLIMBERS — Complete Linemen's equipment, W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.

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BOOTHS — Telephone — Outdoor — Indoor — Steel — Stainless Steel — Sherron Metallic Corp., 1201 Flushing Ave., Brooklyn 37, N. Y.

COIN COUNTERS

A COIN COUNTING MACHINE quickly and accurately counts Pay Phone collections. Rental rate is insignificant. Watkins Company, Box 146, Napoleon, Ohio.

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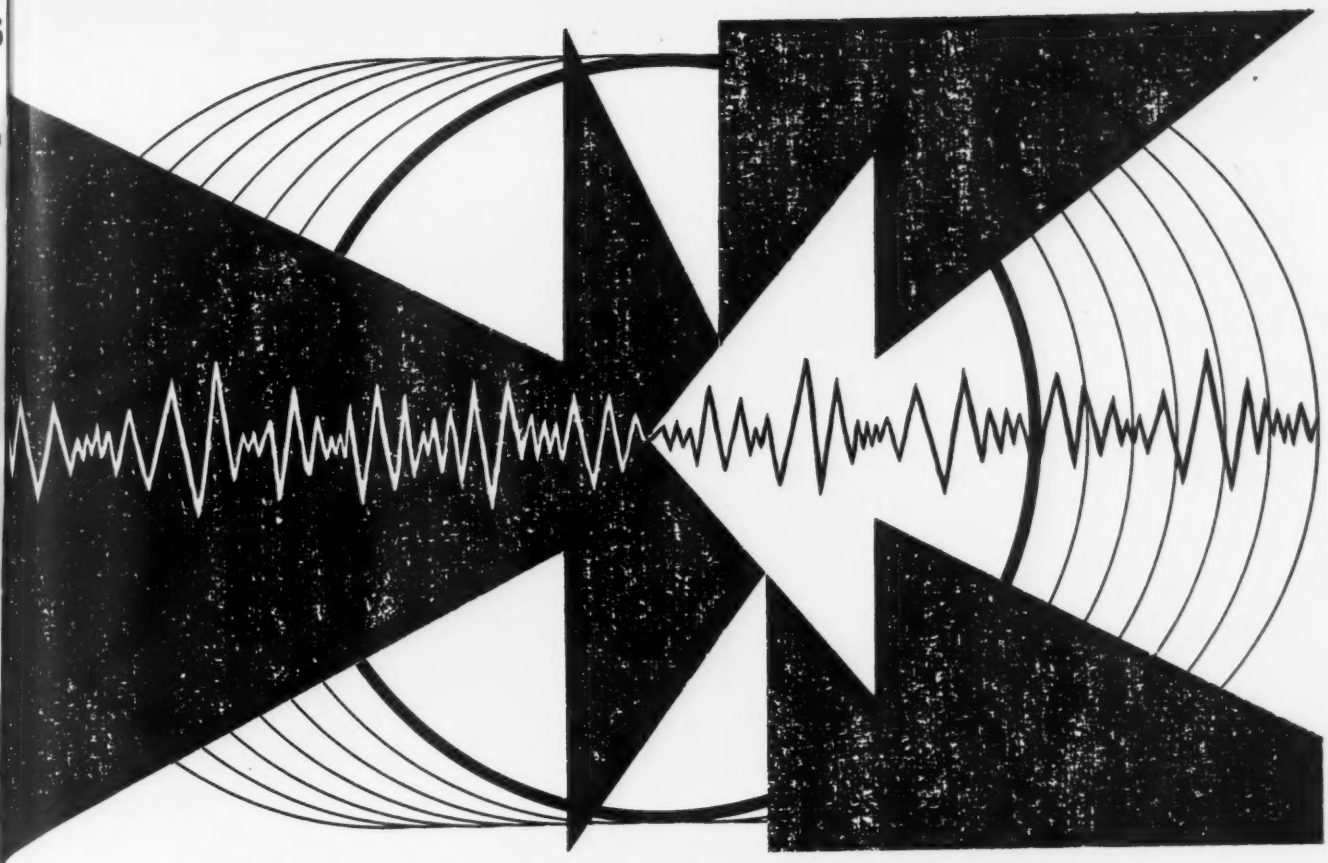

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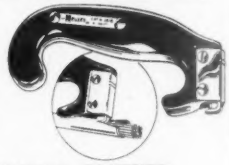

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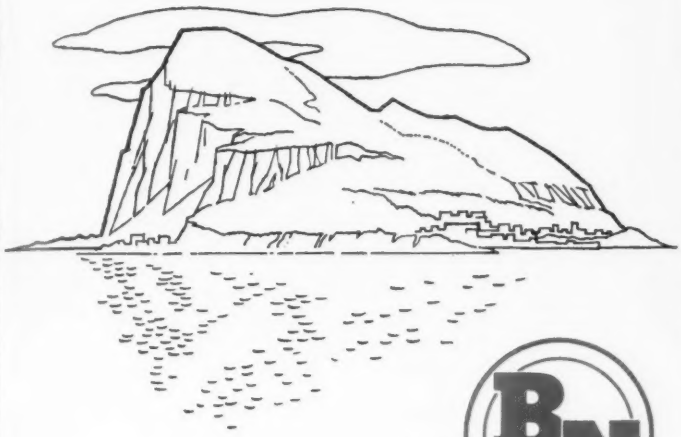

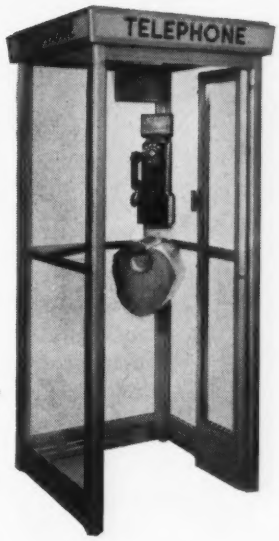

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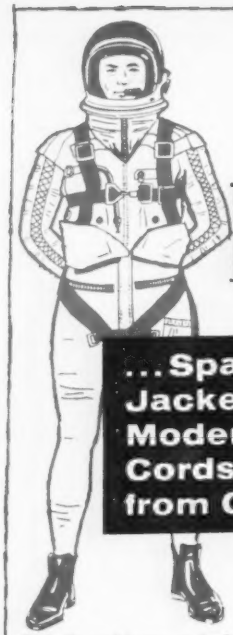

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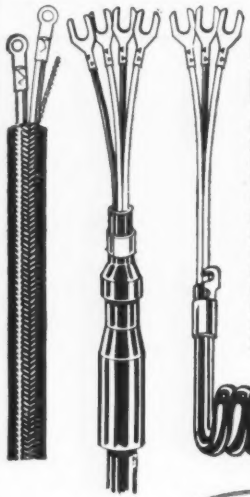

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THE BACK OF THE BOOK

By JOHN G. REYNOLDS

"A Good Reason"

STRAWS show which way the wind blows and the following item may be the beginning of a trend. At any rate, the residents of a New Jersey community say that they don't hold with unnecessary government spending. They proved their point in the most practical way possible.

They turned down — with thanks — an offer of the Post Office Department for a new 1,100-square-foot post office which would have cost about $10,000.

The reason for their refusal was based on a very sound premise. Their old one, they said, was quite good enough.

Operator Talk

SOUTHWESTERN Bell's employe magazine tells us of the Wichita operator who had completed her training for work on the information desk. The last thing she heard from her supervisor was a reminder that she must never suggest or show preference for any business.

All went well for the first few calls, and then a customer asked: "What's the number of the Best Cab Company (a Wichita firm)?"

"I'm sorry," answered the newcomer to Wichita. "We are not allowed to show preference to any cabs."

And also from Kansas comes the story about a Leavenworth information operator and the customer who spoke broken English. After much difficulty, Cecelia decided the woman wanted the number of "Susie Pheiffer."

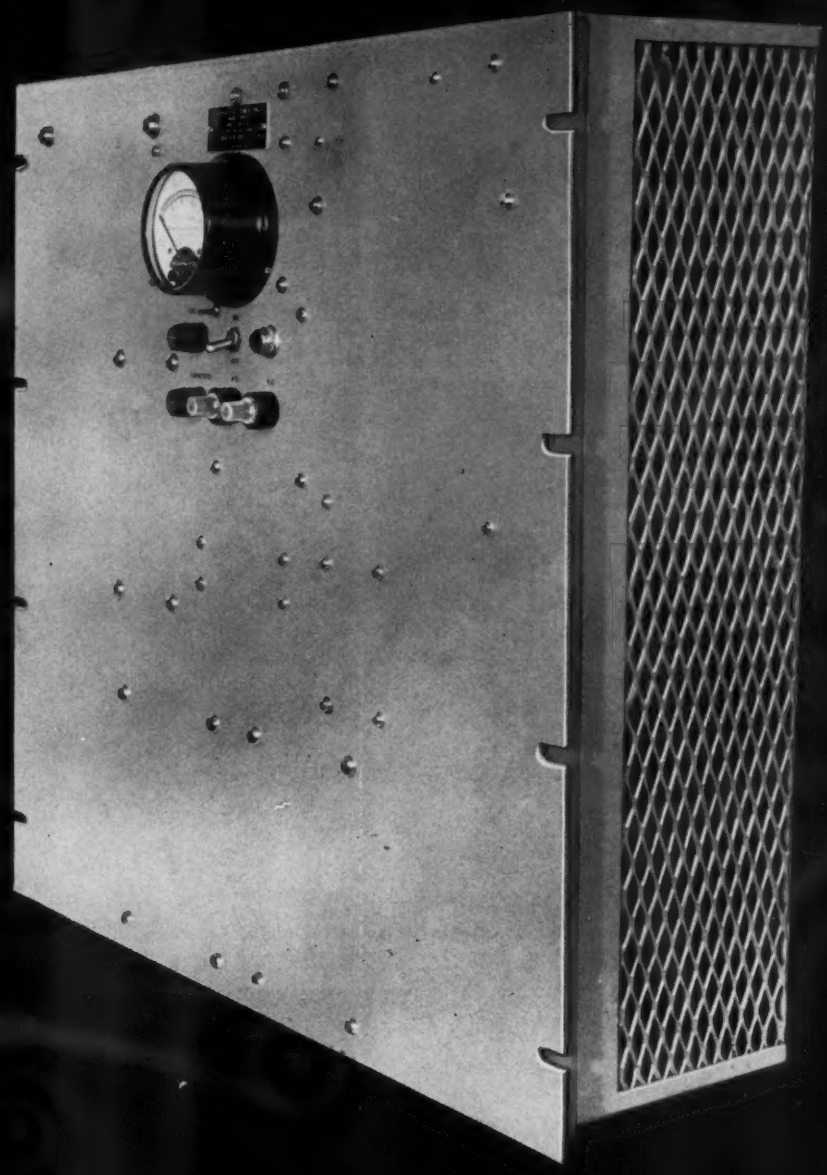
"Will you spell that name, please?" she asked, and the customer haltingly spelled out: "S-U-P-E-R-V-I-S-O-R."

Mandy Is No More

VERY FEW human beings, except Russians in the Caucasus, live to the age of 150 years. Very few mules live to the age of 46, which is roughly comparable. But Mandy, a retired telephone mule, made it before she passed to her reward.

Mandy was well known by old-time telephone company workers around Mineola, Tex. In her younger days, she worked hard hauling telephone poles and stretching wire in many East Texas cities.

Mandy was a native of Smith County, Texas, and was reared by Mrs. Tom Waters of Mineola from the age of four. The mule was relieved of heavy work many years ago, but continued to help with light plowing around the Waters garden and fields almost to the time of her death. One spring morning Mrs. Waters went out to the barn and found that Mandy had died quietly in her sleep. To Mrs. Waters, it was almost like losing a member of the family.



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. . . because it requires no standby equipment where batteries are used in PBX (both ringing and tone generators are d.c. operated).

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Models — seven 24-volt models, seven 48-volt models available

Charger/Eliminator capacity — 6–40 amps in 24 v. units 3–20 amps in 48 v. units

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Dial/Busy tone Generator — input, 24 or 50 v. nominal output, 25 milliwatts, 600 cycles modulated at 120 cycles

Line Load Regulation (used as Battery Charger): ± 1% from 0-100% load. 20 millivolt ripple

Line Load Regulation (used as Battery Eliminator): ± 2% from 0-100% load. 30 millivolt ripple

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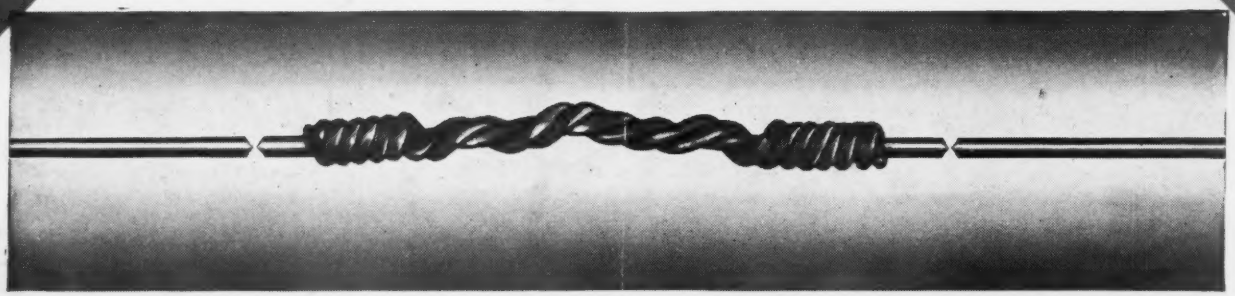

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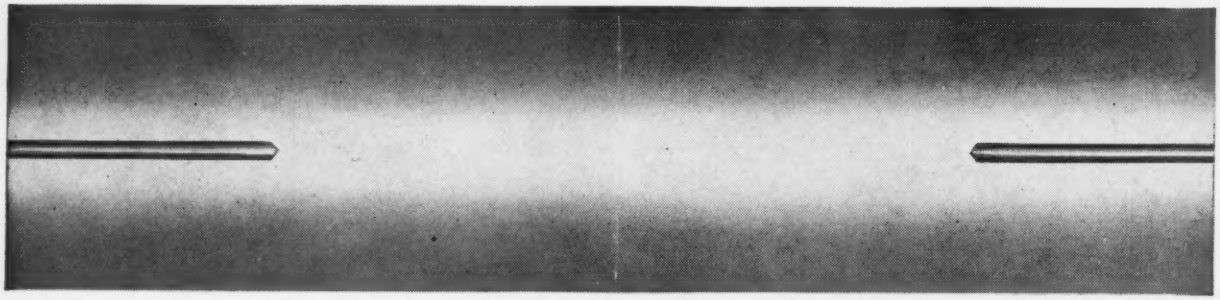

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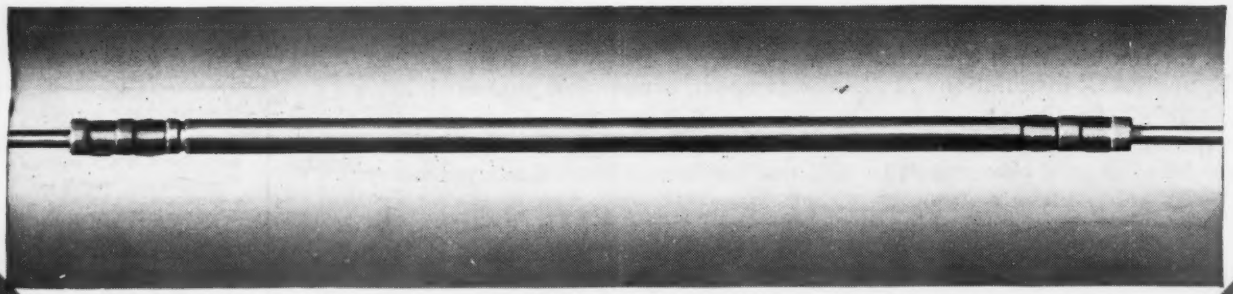

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